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MONTANA OUTDOORS

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the cover

What better way to kick off our special eastern Montana issue than a cover featuring one of the area's most popular game animals, the mule deer? This photo comes from the camera of Jon Cates, Route Two; Missoula, MT 59801. Turn to page 22 for nine more color-filled pages on this part of the Treasure State. The back cover is courtesy of the National Wildlife Federation. Habitat loss stands out as the most serious factor affecting wildlife today. So the federation's theme for National Wildlife Week (March 16-22), "We care about wildlife habitat," certainly seems appropriate.

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a livable environment for WILDLIFE is a quality environment for MAN

EASTERN MONTANA

Unfortunately, western Montanans and out-of-state visitors are often unfamiliar with eastern Montana. As a case in point, how many readers have *ever heard* of the Long Pines, a scenic and wildlife-rich region near Ekalaka?

Eastern Montana has a diverse wildlife community. The fishing—although not always trout fishing—equals the western waterways. The scenery is not outdone by the western parks. Natural resources and recreational opportunities abound. And the remoteness and rural life style have an unmatchable charm all their own.

Although void of treacherous crags and mountain goats, eastern Montana has as much going for it as the western forests.

But because of the abundant natural resources, eastern Montana is also beset with many environmental crises. The scenic pine hills and rolling plains are underlain with rich seams of coal, now eagerly sought by corporate America. The lifeblood of this region, water, is also threatened by industrialization. Water use, coupled with coal development, will undoubtedly drastically affect the area's present agricultural practices. The fertile bottomlands and hay meadows could be strip mined, severed by railroad spurs or flooded by federally supported impoundments. The federal government is leaning toward making parts of eastern Montana "national sacrifice areas" to keep the rest of the nation running.

From our point of responsibility, all this becomes a virtual catastrophe for wildlife and recreation.

With this in mind, we've devoted this issue to eastern Montana, its charm, wildlife and resource problems. Hopefully, you will enjoy it—and that especially goes for those who still believe this is a desolate wasteland with little to offer.

Wes Woodgerd

Wes Woodgerd, Director
Department of Fish and Game

THE TONGUE RIVER

article by Al Elser

please turn the page

In a state endowed with fabulous trout fishing, prairie streams and their recreation potential are often ignored.

(upper left) Family recreation on the Tongue River Reservoir. F&G photo by Al Elser. (lower left) The reservoir and the river offer diversified fishing. F&G photo. (upper right) An aerial view of the reservoir and river. photo by Charles McGlothin. (lower right) The Tongue River area supports waterfowl and other wildlife. F&G photo by Ken Walcheck

THE TONGUE RIVER

IT WAS ONE of those super September evenings when the river was smooth and clear; fall was in the air. Now and then, a feeding fish rippled the surface. One more stroke of the paddle brought the canoe into position.

Three false casts and my red and yellow bass popper spun off a king-sized boulder and hit the water with a splat. My bug sat unmolested; I nudged it with a couple of twitches—still nothing. Then on the next soft pop a waiting smallmouth cruised to the top and the bug disappeared in a frothy swirl. Up went the tip of the rod, and the initial surges of the bass were dampened by letting it fight the rod bend and line tension. Skillfully countering every evasive move, the smallmouth was worked toward shore.

Sound like a midwestern fishing yarn? Perhaps so, but angling experiences like this occur frequently on the Tongue River in southeastern Montana. And the fishing potential doesn't end with tackle-bustin' smallmouth. Record class northern pike, walleye, sauger, black crappie and white crappie are also there for the taking. In a state endowed with fabulous trout fishing, prairie streams and their recreational potential are often ignored. The Tongue River and Tongue River Reservoir are bright spots in southeastern Montana, offering fine warm water fishing, canoeing, boating and water skiing as well as hunting for waterfowl, upland game birds and big game.

RESERVOIR FISHERIES MANAGEMENT

The headwaters of the Tongue River rise in the Big Horn Mountains of Wyoming. The river generally flows northeast out of Wyoming, to its confluence with the Yellowstone River at Miles City. Flows in Montana are controlled by the Tongue River Dam. This 3,500-acre impoundment was constructed in 1938 by the Montana Water Resources Board as an irrigation storage reservoir. Sheridan, Wyo. is about 20 miles south of the reservoir.

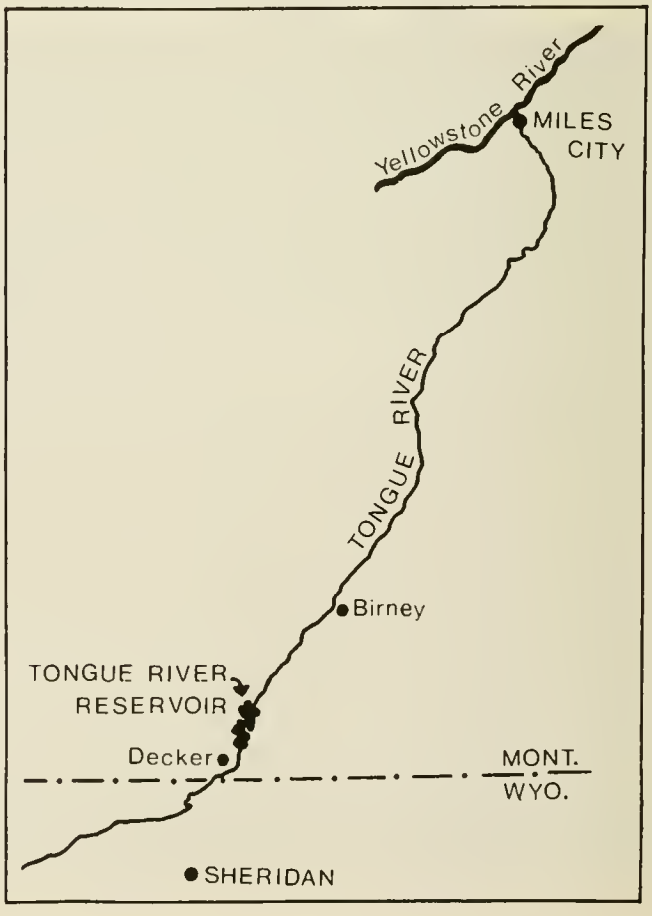
Fishing in the reservoir was rather bleak until 1957 due to lack of management. In 1957, the reservoir was chemically treated to eradicate undesirable fish species, such as carp and suckers. Rainbow trout were then planted in the reservoir in an attempt to create the excellent fishery that follows construction of an impoundment. (A new impoundment offers "instant" habitat. It's an unfilled niche with all necessary ingredients for fish growth—space, food and lack of competition.)

While anglers reported some good rainbow catches, sampling in 1960 indicated minimal trout survival. Fluctuating water levels, high water temperatures and the build-up of undesirable fish added to the trout fishery's demise.

In 1963, northern pike were stocked as the first step in development of a warm water fishery. Channel catfish were introduced in 1963 and largemouth bass were planted in 1964, 1971 and 1972. From 1965-1969, attempts were made to establish a walleye fishery. Smallmouth bass found their way into the reservoir when high spring flows from the Tongue River washed into a strip mine pond near Sheridan.

How are the introduced species faring? Fish sampling suggests that northern pike are not reproducing successfully in the reservoir. They move into submerged vegetation in early spring, soon after the ice breaks up, and deposit their eggs. But one characteristic of a fluctuating reservoir like the Tongue is the exposed mud flats resulting from normal draw-down patterns. This fluctuating water level prevents establishment of shoreline vegetation, thus limiting northern pike reproduction.

In contrast, walleye pike have increased and more



THE TONGUE RIVER

important, capture of several small walleyes indicates successful spawning. Walleyes also move into shallow water to spawn in the spring, but scatter their eggs over gravel or larger rocks.

Water level management followed a pattern of storing water during March, releasing in April (when northerns and walleyes are spawning) and storing again in May. Thus, even if northern or walleyes were able to spawn, their eggs would have been left high and dry. In 1972, release patterns were altered and water levels maintained during April, enabling the walleyes to spawn successfully. As a result, anglers now creel more walleyes. But lack of submerged vegetation still prevents successful northern pike reproduction.

Black crappie and white crappie have increased both in number and size. Crappie weighing three pounds were common in spring samples. Smallmouth bass and sauger, recent additions to the fishery, are reproducing and showing up in anglers' creels.

Present fishery management has two objectives: (1) to compare how various fish species are doing and (2) to accurately document the effectiveness of management tools. Expanded reservoir studies in 1975 will include measuring population dynamics, biomass (weight), angler utilization of major sport fishes and assessing the contribution of selected nongame species to the production of game fish. Some physical and chemical characteristics will be measured. These studies will allow intelligent decisions on water level management to enhance sport fishing in the reservoir.

Above the reservoir, the Tongue River meanders through a broad, open valley with a wide floodplain. Turbid water, slow velocity, muddy bottoms and warm temperatures characterize the stream. Downstream from the dam, the river flows for 10 miles through a narrow, restrictive canyon. As gradient increases, water temperatures cool and gravel bottoms are common. This canyon area provides an excellent opportunity for novice canoeists with no treacherous white water, but abundant eastern Montana scenic splendor. From the canyon to the river's mouth, the valley again broadens and physical characteristics change from those of the canyon into a slow, meandering stream.

ABOVE THE RESERVOIR

Fish in the Tongue River exhibit a succession pattern in species composition, relative to habitat differences. For example, channel catfish are the predominant sport fish in the river above the reservoir. Brown trout sometimes weighing over five pounds, northern pike and black and white crappie occur immediately downstream from the dam. Catchable rainbow trout are planted in this section of river and provide good fishing.

Fingerling smallmouth bass were introduced in 1968 and 1969. Electrofishing (a fisheries biologist's sampling technique) reveals that smallmouth bass are reproducing and are extensively distributed throughout the river. The Tongue River supports the only self-sustaining population of smallmouth bass in Montana. Smallmouth appear more frequently in anglers' creels as popularity of the sport increases. Bass fishing action centers around Birney, and in the lower Tongue River near Miles City.

Northern pike are also plentiful in the middle reach of the river near Birney. Spawning northerns run up Hanging Woman Creek and provide good spring angling. The presence of young fish indicates successful reproduction here.

Important sport fish in the lower Tongue River are sauger, channel catfish, burbot (ling), shovelnose sturgeon and paddlefish. Spring sampling with large mesh gill nets and electrofishing revealed good spawning runs of sauger and shovelnose sturgeon, with sturgeon weighing 15 pounds common. (Before 1974, the largest reported shovelnose taken in Montana weighed eight pounds.) Burbot, early spring visitors to the Tongue, are not usually taken at other times of the year. Channel catfish and sauger can be caught year-round. Paddlefish snagging occurs during spring migration and each year, several of these ancient relics are taken near the mouth of the Tongue.

Nonsport fish include shorthead redhorse, longnose and white suckers, carp, bigmouth and smallmouth buffalo, river carpsuckers, goldeye and several minnows. A spawning run of large blue suckers was sampled in the lower Tongue in 1974, documenting the second known record of these unusual suckers in the Yellowstone drainage. (They normally inhabit deep water in larger rivers.) The Tongue River also supports Montana's only rock bass population.

Fisheries biologists for the Montana Department of Fish and Game are inventorying fish populations of the Tongue River and its tributaries to determine species composition, distribution and diversity within the river's various habitats. Results of the Tongue River study will be compared with fish population studies in the main stem of the Yellowstone River. The comparisons help determine similarities and differences between the Tongue

continued

THE TONGUE RIVER

River sub-basin and the entire Yellowstone River Basin. Information about flow requirements for the fish in a prairie stream will be collected. Such information will be invaluable in negotiations for minimum flows in the river to sustain healthy fish populations.

The Tongue River is important to the people of southeastern Montana. It provides water for domestic use by man and livestock, irrigates crops and offers recreation.

As coal development threatens the Tongue River drainage, the river takes on a new importance. The Decker-Birney Resource Study of April 1974 identified strippable coal reserves underlying 359,333 acres of the planning unit in the Tongue River drainage. Approximately 285,000 acres of this planning unit is composed of superior reserves—containing 15 billion tons of coal—which are economically feasible to mine. Other coal reserves exist outside the Decker-Birney unit, yet are associated with the Tongue River.

What does the future hold? The Tongue River Reservoir will become increasingly important in light of proposed coal development. While most coal mined in Montana now leaves the state, coal conversion complexes (steam-fired generation, gasification and liquefaction plants) close to the coal source loom on the horizon. Such energy complexes require great amounts of water and the Tongue River is considered an important source of industrial water.

Montana Power Co. recently obtained an option for 4,000 acre-feet of Tongue River water. The 1972 Montana-Wyoming Aqueduct Study identified a new Tongue River dam site downstream from the existing dam. The new reservoir would inundate about 12 more miles of Tongue River country and provide an additional 60,000 acre-feet of water. A recent Northern Great Plains Resource Program report (April 2, 1974), suggested that the New Tongue River Reservoir will fit into the "most probable" scenario for industrial development. Early in 1974, Water Reserve Co. of Montana and Montana Water Storage Co. filed on 221,000 acre-feet annually of Tongue River water. These figures are especially startling if one examines the mean annual flow figures for the Tongue: 306,500 acre-feet at Miles City, 441,900 at Ashland, 325,300 below the dam and 357,200 acre-feet per year at the state line.

The water would be pumped into off-channel storage reservoirs and sold for agricultural, domestic or industrial uses. The magnitude of the proposed industrial use of the Tongue River makes it imperative that adequate flow levels are insured to protect the fishery.

Angling pressure throughout the Tongue River is light. To the serious fisherman who wants to get away from the crowd and enjoy warm water fishing, the Tongue River is the place to go. From the numerous bays and small coves of the reservoir to the quiet pools and riffles of the river, the opportunities are almost unlimited. Whether you are interested in 3-pound crappie or 30-pound northern pike in the big pond, or 3-pound smallmouth and 15-pound channel catfish in the river, the bright spot of southeastern Montana offers it all.

Next Time

Watch for these features in the May/June 1975 issue:

First Aid for Fishermen—Some basic methods for removing hooks, treating burns and insect bites and fundamental precautions every angler should take.

The Canyon Ferry Project—Department biologist Don Childress describes this cooperative project with the Bureau of Reclamation. When completed, an area formerly known only for its dry mud flats and dust storms could become one of the best waterfowl areas in Montana.

Mushrooms—Another Montana Outdoors Recreation Guide. Author Fran Davis goes into the how, where and when of a rapidly growing pastime, mushroom hunting. She also has some tasty ideas about what to do with the fungi when dinnertime comes.

The Sandhill Crane—Ken Walcheck, frequent contributor to MO, describes this unusual bird.

Lead vs. Steel Shot—Which is best for wildlife? Waterfowl expert Dale Witt explains the department's position on this controversial question.

Also—an editorial about keeping young wildlife as pets, a recap of the state fishing records, details about department activity on energy development and the facts about hypothermia.

THE ENERGY CRISIS AS A COAL MINER SEES IT

by Arnold Miller, President
United Mine Workers of America

I was born in the mountains of West Virginia, and my views are the views of a coal miner. Coal mining is hard, dirty work, and when you have time to think on the job, you mainly think about your survival. I have spent most of my life just trying to survive, and what free time I had left over I spent on trying to reform the union I belonged to. That is hard work, too. So my views are generally geared to getting from one day to the next.

When I first began thinking about what I wanted to discuss at the Center, a number of possibilities struck me. I could concentrate on what it is like to try to run a union in the process of reforming itself. Or I could discuss coal miners and the energy crisis. Then I began thinking about your name — The Center for the Study of Democratic Institutions — and it occurred to me that coal miners don't have much opportunity to study democratic institutions, because there are so few such institutions where we live. Our union is only now getting serious about democracy. The industry we work for is totally undemocratic. The state legislatures that it controls pay lip service to democracy, but that is as far as they are willing to go. There are a few congressmen and senators from coal states who are a credit to democracy, but most of them are not interested in it unless the price is right. Then there is the White House. The people there are supposed to know about democracy and they also have a great deal to do with policies affecting coal miners. But based on what I have seen and heard from there, especially since Watergate, the idea of "democratic institutions" doesn't impress *them* much. So I come down to the idea that I would like to talk about democratic institutions if only because it is such an unfamiliar subject to me.

Of course it is too big a subject for anyone to handle. I know I ought to narrow it down. However when I was still working underground, long before I knew any people who called themselves environmentalists, I ran across what the founder of the Sierra Club, John Muir, said: "When we try to pick out anything by itself, we find it hitched to everything else in the universe." I think that is about as true as any idea I ever heard. You can't talk about coal without talking about energy. You can't talk about energy without talking about oil. You can't talk about oil without talking about politics. You can't talk about

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We already know what it is to work for people who think of themselves as above the law. The coal industry has always been that way. If you don't believe it, look at what is left of the company towns they built—and then sold to us when they no longer needed them. Look at the roads all over Appalachia. Look at the men who were battered and broken in the mines, and then forgotten. Look at the stripped hills and the rivers running red with acid. Look at all that, and look at the coal companies' tax returns, and then tell me the coal industry isn't above the law.

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politics without talking about corruption. You can't talk about corruption without talking about companies that are so big that they can give half a million dollars to a politician without its even showing up on their books. You can't talk about companies like that without talking about energy, because they supply it. And you can't talk about energy without talking about coal. So I will talk about all of these things, and if I wander around, you can blame it on the Sierra Club. That is what the coal industry does.

I still run into people who think that the coal industry died when railroads converted from steam locomotives to diesel. They are very surprised when I point out to them that their electrical appliances burn coal. They don't see it because it is delivered by wire. The steel that goes into their cars could not have been produced without coal. That is true even if they are driving a Japanese car, because it is exported American coal that the Japanese steel industry uses — and then sends back to us, at a comfortable profit. I am sure, though, that you all know enough about our economy to realize that coal is the basis of it. If we stopped digging coal in September, the country would shut down in October, after the stockpiles ran out. It is that simple.

We are producing, at this point, about 590 million tons of coal a year from twenty-four states. West Virginia and Kentucky are the leading producers. They account for about forty per cent of last year's total between them. In the east, the other principal coal-producing states are Pennsylvania, Ohio, Illinois, Indiana, Maryland, Virginia, Tennessee, and Alabama. Moving westward, there is production in Oklahoma, Arkansas, Iowa, Kansas, and Missouri. The big reserves are in the Rocky Mountains and the Northern Plains.

All this coal is being mined by an estimated 150,000 men, which makes coal one of the most productive industries in the country. About 125,000 of those men belong to the United Mine Workers (our total membership, including retired miners, is about two hundred thousand). You can get some sense of how the coal industry has changed through mechanization by realizing that thirty years ago we were producing roughly the same amount of coal every year, but then it required a work force of about six hundred thousand to do it. Today the coal industry is about ninety-eight per cent mechanized.

More than half of the coal we produce goes to electric utilities. We deliver about ninety million tons to the steel industry. We export about fifty-seven million tons. We deliver the rest to a wide variety of other industries, particularly those producing chemicals, which rely heavily on coal and coal by-products.

Mainly because of mechanization and the high productivity that results from it, the price of coal traditionally has stayed low. That is the price to the consumer. The hidden cost of coal is the one we pay — the people who mine it. It is a high price. We get killed. Since the Bureau of Mines started keeping records of such things back in 1910, about eighty thousand of us have been killed. No other industry comes close to that. And we get black lung, from exposure to fine coal dust in the mine air. That problem has been with us through the history of the industry, but the companies and the company doctors have denied it even existed. They were still denying it in 1969 when the Public Health Service finally got around to releasing a study it had been sitting on for sixteen years that showed that one hundred thousand or more miners and retired miners were afflicted. And "afflicted" isn't a strong enough word. Dying of cancer is no worse. This old disease has become worse with mechanization because the high-speed mining machines stir the coal dust up much more intensely than in the old pick-and-shovel days. We have had our technological progress in coal, just as in other industries, but we are still being smothered to death.

There are other hidden costs in coal. Underground mining produces acid wastes and gob piles. Strip mining destroys mountains and poisons watersheds. It also poisons people's lives. There is probably nothing worse than knowing those big shovels are coming to take your land and the house you grew up in. If you are poor, you don't have too many ways to fight back, and it is tempting to take whatever they offer you. That brings me back to John Muir's idea about everything's being hitched together to everything else. You are poor in the first place because of the coal industry — if you live in an Appalachian coal camp. They make you poor and then they come and take advantage of it. That is a hidden cost. Anybody who has had to fight the coal industry knows what it is like to pay it.

We have learned from bitter experience that when you fight the coal industry, there are terrible odds against you. The concentration in the industry is extreme. Of course, the industry says this is ridiculous. The industry spokesmen are always pointing out that there are five thousand mines and 1,200 mining companies. And then they ask how any industry with that

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many companies in it could possibly be concentrated. They get away with this question because so few people know anything about the industry. But the simple fact is that fifteen companies produced 301,208,359 tons last year, which was fifty-one per cent of the total. The top fifty companies combined produced 400,000,000 tons — two-thirds of the total. I am not an economist, but you don't have to be to know that any industry which has half of its production controlled by fifteen companies is concentrated. It is more concentrated, in fact, than those figures indicate. And what is really important is to understand where the concentration goes — where the puppet strings lead to, to put it another way.

First, let me list the top fifteen companies by their coal industry names, and you can see how many you recognize. Peabody, Consolidation, Island Creek, Clinchfield, Ayrshire, U.S. Steel, Bethlehem, Eastern Associated, North American, Old Ben, Freeman & United Electric, Westmoreland, Pittsburg & Midway, Utah International; and, in fifteenth place, a group: Central Ohio Coal, Central Appalachian Coal, Windsor Power House Coal, Central Coal, and Southern Ohio Coal.

If you have ever heard more than five of those names, you must have grown up in Appalachia, or you have been studying the industry. But the next question is harder. Who owns those fifteen companies? How many of them speak for themselves?

Peabody Coal is a wholly-owned subsidiary of Kennecott Copper. Consolidation Coal is a wholly-owned subsidiary of Continental Oil. Island Creek is a wholly-owned subsidiary of Occidental Oil. Clinchfield is a wholly-owned subsidiary of the Pittston Company, which operates oil refineries and owns the Brink's armored car company so that it won't have to pay someone to carry its cash around. Ayrshire Coal is a wholly-owned subsidiary of American Metal Climax (Amax). U.S. Steel and Bethlehem own their own coal-mining operations. Eastern Associated is a division of Eastern Gas & Fuel. North American Coal is independent. (You have to get down to number nine on the list to find an independent coal company.) Old Ben is a wholly-owned subsidiary of Standard Oil of Ohio. Freeman Coal and United Electric are wholly-owned subsidiaries of General Dynamics. Westmoreland Coal is independent. Pittsburg & Midway is a wholly-owned subsidiary of Gulf Oil. Utah International is independent, but not strictly a coal company. It has worldwide operations in copper, iron ore, and other minerals. And that last group — Central Ohio Coal, Central Appalachian Coal, Windsor Power House, Central Coal, and Southern Ohio Coal — is a division of American Electric Power, the biggest private utility company in the world.

You realize very quickly that the coal industry is not what it seems to be at first glance. You have oil companies controlling two of the top three. Kennecott Copper controls the biggest of them all — a company which produced nearly seventy-two million tons last year and plans to double that by 1980. This one company, which gets about eighty per cent of its coal from strip mining, produces about twelve per cent of the industry total. In fact, Peabody alone outproduces the combined effort of the seven companies at the bottom of the top-fifteen list.

The oil industry knows that you don't refine more gasoline than you think the country will need, because if you do, the price will go down.

In the coal industry a very small number of very large companies not only sets the pace for the rest but also has the power to swamp them financially. What other industry has this same pattern? Everybody knows: oil. But not everybody knows that the oil industry effectively controls the coal industry. It shares that control to some degree with other industries — with Kennecott, with the steel people, and with utilities. I don't deny that they have their differences of opinion from time to time, and maybe even a little competition. But not very much competition, and less of it every day.

We are all slowly learning that the oil industry is more than that now. It has wide-ranging interests: coal, natural gas, uranium. It is an energy industry, though that is too polite a name. The Federal Trade Commission recently observed that "the industry operates much like a cartel" and filed suit to try to break it up. Exxon, Texaco, Gulf, Shell, Standard Oil of California, Atlantic-Richfield, Standard Oil of Indiana, and Mobil between them control fifty-one per cent of crude oil production, sixty-four per cent of crude oil reserves, fifty-eight per cent of all refining, fifty-nine per cent of refined gasoline, and fifty-five per cent of gasoline marketing. "A nation that runs on oil can't afford to run short," they say in their advertising. In the long run, it may be much more true that a nation that runs on energy can't afford to fall into the hands of a cartel. We already have some firsthand experience with shortages. But today's are nothing compared to tomorrow's. I think

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shortages are directly connected with concentration. The experience of the coal industry here is likely to be educational.

The bigger companies, with effective control of their market, have no incentive to expand except when they are absolutely certain in advance of selling every ton of coal at acceptable prices. Their goal is to remove every last bit of risk from the business (except in the area of safety, where they are still willing to take all kinds of risks).

This was true even before they started being devoured by the oil industry; it is twice as true now. The oil industry knows that you don't refine more gasoline than you think the country will need, because if you do, the price will go down. In the days of competition you had less chance of manipulating the total production. These days, when competition in the oil industry is a joke, you can manipulate whatever you feel like manipulating, starting with the White House and the Interior Department and going on from there. The biggest oil-coal combines are sitting on vast reserves of readily recoverable coal. But that coal will come out of the ground only when the men who own it can be sure of the price they will get for it.

That is a simple objective, but it immediately becomes complicated. Coal, oil, and gas are largely interchangeable as far as electric utilities are concerned. They all produce Btu's. Many generating plants have been designed to take any or all three. If coal were still one hundred per cent competitive, there would be an incentive to mine more of it, sell it to the utilities at the lowest possible prices, and undercut oil and gas, which are increasingly difficult to find and bring to market, especially if you have to go overseas to do it. But coal is not one hundred per cent competitive. It has problems of environmental damage and it is hard to transport efficiently. More importantly, however, it is being kept in the back room by the oil industry. When the other commodities are gone from the shelves, the industry will bring out coal. And it will sell for what the industry wants it to sell for.

Not long ago I was reading the testimony of John O'Leary, the director of licensing with the Atomic Energy Commission, before the Senate Interior Committee during its June hearings on energy problems. Mr. O'Leary is an economist by training. He was also director of the Bureau of Mines until someone in the White House decided that he was doing too good a job and got rid of him. He knows a great deal about oil companies and their interests in coal and other fuel sources. I was impressed by the clarity of something he said:

"Oil companies today have two overwhelming interests. The first is to increase the value of their domestic reserves, thereby enhancing their book value. The second is to liquidate as rapidly as possible their foreign holdings, thus maximizing current income from these holdings should these holdings for one reason or another be denied in the future.

"These strong and practical motivating forces run absolutely counter to the current public interest in energy research and development, which calls for rapid development of alternatives to conventional fuels. For the oil industry as a whole . . . a world without alternatives to conventional oil and gas is a better world than one which had available the sorts of alternatives that can be developed through research and development."

Not only is this a valuable summary of a dangerous situation, but it happens that the very day after Mr. O'Leary made these remarks, the A.E.C. put out a huffy statement to the effect that these were O'Leary's personal views and had nothing to do with those of the A.E.C. The oil people must have been on the phone to all the right places the moment he finished testifying. They rarely have to listen to that kind of truth from anyone within the government these days.

The reclamation in Appalachia—to borrow a phrase from a former officer of our union—is the small end of nothing, shaved down to a point.

I like Mr. O'Leary's language because he steers clear of any talk of conspiracy. Words like that still tend to put people off. Instead, he describes in matter-of-fact language a situation in which the oil industry is on a collision course with the rest of us, and he uses the word "practical" to describe the industry's motivation. I think he is right. What is practical for eight or ten companies may be disastrous for two hundred million people. In that situation, the industry obviously must yield. But when was the last time we saw the oil industry yielding?

For coal miners, this isn't just a little spare-time exercise in industry-baiting. The idea of an unrestrained oil-coal-gas-uranium cartel is terrifying to

us. We already know what it is to work for people who think of themselves as above the law. The coal industry has always been that way. If you don't believe it, look at what is left of the company towns they built — and then sold to us when they no longer needed them. Look at the schools in eastern Kentucky. Look at the roads all over Appalachia. Look at the men who were battered and broken in the mines, and then forgotten. Look at the stripped hills and the rivers running red with acid. Look at all that, and look at the coal companies' tax returns, and then tell me the coal industry isn't above the law.

The coal industry has its own "practical" reasons for being the way it is. If we have any warning to pass on to the rest of the country, it is to watch out for large industries with practical motivations.

Unfortunately, common sense has almost nothing to do with the way we consume energy in America. Not only do we consume more of it than we should — it is a widely quoted statistic that we add up to six per cent of the world's people and burn up about forty per cent of the world's energy — but we consume more of it all the time. Population increased fourteen per cent from 1961 to 1973; per-capita consumption of energy went up forty per cent. And while we are busily consuming more every day, we are burning up the wrong things. Oil and natural gas account for 77.9 per cent of our current total energy consumption — almost a direct inversion of the figure for available reserves. Coal accounts for 17.5 per cent. Hydroelectric and nuclear sources provide the remaining 4.6 per cent. It is not just because I am a coal miner that I consider this a ridiculous situation. It is also because I am a citizen. My interests as a citizen are not being served by this kind of arrangement.

There are various reasons why coal is low on the list of fuels currently supplying our energy requirements. The biggest reason has to do with simple expediency. Aside from the fact that coal is difficult to transport and requires large storage facilities, it also comes out of the ground mixed with various impurities. The most serious is sulphur. The burning of coal produces other impurities — fly ash, particulates — but electrostatic precipitators and redesigned boilers have largely brought those under control. But sulphur is not under control, and that is a very serious problem, since a high percentage of the coal we mine in the East is high-sulphur.

A few months ago I was in a meeting with some coal barons who were wringing their hands about the sulphur problem and how it was affecting their sales. I couldn't argue that it was having that effect, but I could still ask them a question: "Gentlemen, when did you first discover there was sulphur in coal?" I knew the answer as well as they did. The discovery goes back hundreds of years. The next question was: "Gentlemen, how much money has each of your companies spent researching ways to handle the sulphur problem?" They changed the subject.

I can understand that they would, because research is not something the coal industry has been comfortable with. Some coal companies will tell you that they have a research department, and in the annual report you will find a picture of a man in a white coat squinting at a piece of coal; but when you go to their headquarters and ask to see the research department, either they have nothing at all or their "research" consists of a technician working out of a converted broom closet fixed up with a Bunsen burner and two or three beakers. All he does by way of research is to analyze random samples coming out of the company's mines.

Having said that, in fairness I should point out that the coal industry's trade association has a research wing, Bituminous Coal Research, Inc., which carries out research for the entire industry. But B.C.R. did not get serious about sulphur problems until the mid-nineteen-sixties. Even then, its involvement was slight.

Further, the industry does not pay its own way in research. It siphons money, through contracts, from the federal Office of Coal Research, which is part of the Department of the Interior. Electric utilities have been criticized because they spend less than a fourth of one per cent of revenues on research. That puts them one-fourth of one per cent ahead of the typical coal company. The coal industry waits for Department of Interior to do it.

Unfortunately, Interior does not do it. The Office of Coal Research, which was lobbied into existence in 1960, is a storefront operation which hands out contracts but does little or no basic research itself. Compare it with the Atomic Energy Commission, which is pushing coal's principal competition after gas and oil reserves run out, and you can see the absurdity of our situation. During the current fiscal year, A.E.C. is operating on a budget of $2.2 billion dollars. O.C.R. has a budget of fifty-eight million dollars. A.E.C. employs 5,800 people; O.C.R. thirty-seven.

About fifteen years ago, the utilities companies on the East Coast began moving away from coal. Gas

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was the ideal fuel — clean and cheap, and nobody said anything about running out of it. Oil was almost as good, especially since removing sulphur from oil is easier than removing it from coal — if you use low-sulphur residual fuel oil, you do not have to deal with the sulphur problem at all. The coal industry responded to the threat like the two men sitting at the table with their feet up telling each other, "Next week we've got to get organized."

The industry wanted the government to do more research but it would rather disappear than let the government exercise any control over the results. For the past fifteen years various people have been proposing a national fuels policy to replace the mess we have now. The coal industry said that would be fine, as long as the people administering such a policy had no actual influence. The coal industry's thinking on free enterprise is stubborn and basic — and, as far as I am concerned, about as enlightened as the robber barons who got the whole thing started a hundred years ago.

Now the utilities are beginning to hesitate. It may be that fewer of them will convert — not because they don't want to, but because they can't be sure of future supplies of oil and gas. In at least one state — New York — the Public Service Commission has ordered utilities not to convert unless they retain the capability of switching back to coal. Naturally the coal industry is pleased with this development, though it did nothing to bring it about.

But this development needs to be looked at in context. And the context is that the key coal reserves being held for future use belong either to the oil industry or to corporations based in the western part of the United States. Western coal is generally of lower heat value than Eastern coal and it is still more remote from its markets, even though the country's growth continues moving westward. But Western coal is generally low-sulphur. And it sits there in gigantic quantities.

The Fort Union coal formation, which underlies eastern Montana and part of North Dakota, is the largest single block of coal in the world. Other coal formations underlying Wyoming, Colorado, New Mexico, and Arizona are enormous. Getting at them is easy, because they lie under less than three hundred feet of "overburden," as the strip-mining industry calls it. You have none of the engineering requirements of a major underground mine, and you need a fraction of the lead time to get started. Your biggest problem is waiting for delivery of a dragline, which will cost you around twenty million dollars to buy. It's worth it. One man operates it, and the bucket picks up anywhere from fifteen to two hundred tons at a swoop (depending on the size of the machine). Even with a small dragline you can load two thousand tons an hour. That is more than a medium-sized Appalachian underground mine can load in a whole shift.

Obviously, Western mining has another attraction. Almost no workers. In the East, the general rule of thumb is that you need about two hundred men to get out a million tons a year. In fact that is the minimum work force needed. In the West, you can clear the same tonnage with ten men. If I were a coal baron, I'd be heading west. And they are. They are gloating about it, too. Ed Phelps, president of Peabody Coal, told his colleagues about it at the National Coal Association convention a few weeks ago: "Talking about Western coal reminds me of that old fisherman's prayer which you sometimes see printed on wooden plaques for sale in sporting goods stores. It goes, 'O Lord, let me catch a fish so big that when I tell about it later, I won't even have to lie.' Western coal reserves are like that fish." That is true, and Ed Phelps's company has already leased an estimated 8.7 billon tons of Western coal. That would last 125 years if he shifted all his equipment west and maintained his current level of production. But his company is looking for more. Meanwhile, he is getting a good start by digging up the Navajo reservation at Black Mesa.

Ed Phelps's prize black fish isn't the biggest catch in the West. Burlington Northern has more than eleven billion tons, and Union Pacific has ten billion. Continental Oil has 8.1 billion. Amax has four billion; Westmoreland Coal, 1.2 billion; Northern American Coal, 2.6 billion; Montana Power, a billion. And there are numerous others we haven't begun to identify, because they buy up coal under assumed names and we do not have the manpower to track through all the records.

So the West sits there, waiting to be developed. There are huge mines in operation there now, of course. But they do not represent a fraction of what is coming if the energy cartel is allowed to pursue its own timetable. The ranchers and environmentalists who are fighting against strip mining in the Northern Plains haven't seen anything yet. Look at the tonnages I've just mentioned, and compare them against Montana's total production last year, which

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was about eight million tons. There are more than thirty billion tons of coal under Montana, and eight million tons is only two-tenths of one per cent of that. We have a long way to go, and if there is any ranchland left in Montana when Ed Phelps is finished, I will be very surprised.

I know all about what they promise: reclamation. "Land as good as it ever was." I know about the "reclamation" in Appalachia because I have to live with it. The reclamation in Appalachia — to borrow a phrase from a former officer of our union — is the small end of nothing, shaved down to a point.

This kind of talk usually gets me into trouble. Several thousand members of our union are strip-mine employees and they don't like to hear their president talking like an environmentalist. What is more, the U.M.W.A. has launched an organizing drive in the West, on the theory that wherever there are men digging coal they should be members of the United Mine Workers. Whenever I say anything critical of the industry I find that it is reproduced and distributed with blinding speed among the men we are trying to organize. Strategically it would be much better to stay silent. But there is a tradition of speaking out in my union, and the westward trend of coal mining creates an issue we have to confront. In West Virginia and Kentucky, all over Appalachia, we found out, as our fathers found out before us, that when the companies no longer need you or want you, all you have left are your scars and the dust in your lungs. And in our hills, what we have left are the scars and the mud slides and the streams choked up with silt where we used to fish.

Sometimes it is much worse than that. Sometimes gas explodes underground and we lose as many as seventy-eight men at a time, as we did in West Virginia in 1968 at one of Consolidation Coal's mines. Or a dam made out of coal wastes lets go in the early morning, and 125 people are carried away and drowned or suffocated under millions of tons of mud. That was Buffalo Creek in February, 1972. That was the Pittston Company's operation, and the industry showed its remorse this year by electing the president of Pittston to the presidency of the National Coal Association.

The moral is simple: beware of industrialists bearing gifts. Fifty years ago they promised to develop Appalachia, and they left it in wreckage. Now they promise to develop the Northern Plains. They will leave it in ruins. A dragline operator working seven days a week can make more than twenty-five thousand dollars a year. I can understand his enthusiasm for the industry he serves; but somewhere we have to find the common ground between miners and "eagle freaks."

"Eagle freaks" are what coal men call the ranchers who liked Montana and Wyoming the way they were before the draglines moved in. Recently I read a magazine report about the Northern Plains problem, and about a rancher named Boyd Charter, who decided he did not want to sell to Consolidation Coal. "Some people can't understand that money is not everything," Mr. Charter said. "I told that man that I knew he represented one of the biggest coal companies and that he was backed by one of the richest industries in the world, but no matter how much money they came up with, they would always be $4.60 short of the price of my ranch." It doesn't matter that he is a rancher and I am a miner. I know what he means. If I owned my hills of West Virginia I would have kept the price $4.60 higher than the industry could pay to strip them. But they had the price, and now we have the mud.

The man from Consolidation Coal did not think much of Mr. Charter. "You can be as hard-boiled about this as you want. But we'll get you in the end." That's how he put it. I know that kind of language. I've heard it all my life.

"A nation that runs on oil can't afford to run short," they say in their advertising. In the long run, it may be much more true that a nation that runs on energy can't afford to fall into the hands of a cartel.

Government, of course, ought to be protecting Mr. Charter's ranch just as it ought to be protecting my fishing, just as it ought to be protecting my safety. But that is not the kind of government we have in Washington. What we have in Washington now is a very well-oiled job-shuttle system. You start out in industry and shuttle over to government for a while and shuttle back into industry again. Let me just briefly cite some examples that come to mind:

☐ Carl Bagge starts out as a lawyer for the Santa Fe Railroad, then is appointed to the Federal Power Commission. He leaves the F.P.C. to become the president of the National Coal Association.

☐ Lawrence O'Connor starts out as director of the Independent Petroleum Association, leaves to join

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the Federal Power Commission, then leaves the F.P.C. to become vice-president and chief Washington lobbist for Standard Oil of Ohio (SOHIO).

☐ Albert Gore is defeated for reëlection as a populist senator from Tennessee, leaves a lifetime of good works and becomes chairman of Island Creek Coal, Occidental Petroleum's wholly-owned subsidiary.

☐ Hollis Dole, Assistant Secretary of Interior for Mineral Resources, leaves government to become president of TOSCO, an oil-shale development consortium in which the principal company is Atlantic-Richfield, run by Robert O. Anderson, a major Republican fund-raiser and G.O.P. national committeeman from New Mexico. Dole is then appointed vice-president of the National Petroleum Council, the half-government, half-industry group that "advises" Interior on energy policy. In his new capacity he returns to Washington to speak for industry. All within a matter of weeks.

☐ Edward G. Failor, a lobbyist and Republican campaign strategist, is put in charge of safety enforcement at the Bureau of Mines. He leaves in June, 1972, to go to work for Charles Colson of the White House, "monitoring" Democrats in Miami Beach.

☐ John B. Rigg leaves the Colorado Mining Association to become Interior Deputy Assistant Secretary for Mineral Programs.

☐ Harry Moffett serves the American Mining Congress as its chief Washington lobbyist for thirty-one years. Then he joins Interior as Deputy Assistant Secretary for Minerals and Energy Policy.

☐ Stephen Wakefield becomes Assistant Secretary of Interior after serving the oil industry as an attorney at Baker & Botts, the Houston law firm, where he represented Pennzoil, the firm which had a hand in "laundering" the Watergate money. At Interior, Mr. Wakefield dismisses any talk of antitrust action against the oil cartel. "A large number of people grasp at the most simplistic solutions," he says. "They must find a culprit. Industry, especially the largest companies, are obvious candidates."

You bet they are.

I would not claim that industry and government are one and the same, because my experience with the federal bureaucracy is that it is a world all to itself. But I do believe that industry and government are much closer together and much less distinguishable than they have a right to be. And I believe that when we talk about developing an intelligent energy policy in this country — a policy designed to serve us all, not just a corporate few — we'd better know that the odds are bad, and the size of the job is almost overwhelming.

As far as coal is concerned, I define the job this way: we must greatly expand total production, on a crash basis, and aim at a goal of domestic energy self-sufficiency as quickly as possible.

We must not rush into development of the West at the expense of the East. A headlong commitment to super-scale Western mining means that over the next five years between twenty-five thousand and forty thousand mining jobs will be lost in the East. Of course, that concerns us as a union of miners. It concerns us also because we have lived through an unending depression in Appalachia, and we simply cannot sit silently and watch another one come rolling in on us. Finally it concerns us because you cannot turn underground coal production on and off like a light switch. If we arrive at a rational fuels policy five or six or seven years from now, and decide to strengthen our emphasis on Eastern mining, the mines will not be there, and neither will the miners.

We must not rush into development of the West at the expense of the West. Our western members need jobs, and we believe they should have them. But that does not mean that we want to see eastern Montana wiped out.

We owe it to ourselves and our children to develop a National Energy Policy that means something more than giveaway. To do that, we will have to make some very tough decisions that nobody is going to be entirely happy about. What I mean by that is that there must be some form of authority empowered to say no to the most powerful corporations in the United States. At the moment there is no such authority anywhere, and there will be none during this Administration.

I know that sounds pessimistic. I am not a pessimist but I would prefer to try to be realistic now than to be taken by surprise later.

Excerpted from an article originally appearing in The Center Magazine, *a publication of the Center for the Study of Democratic Institutions.*

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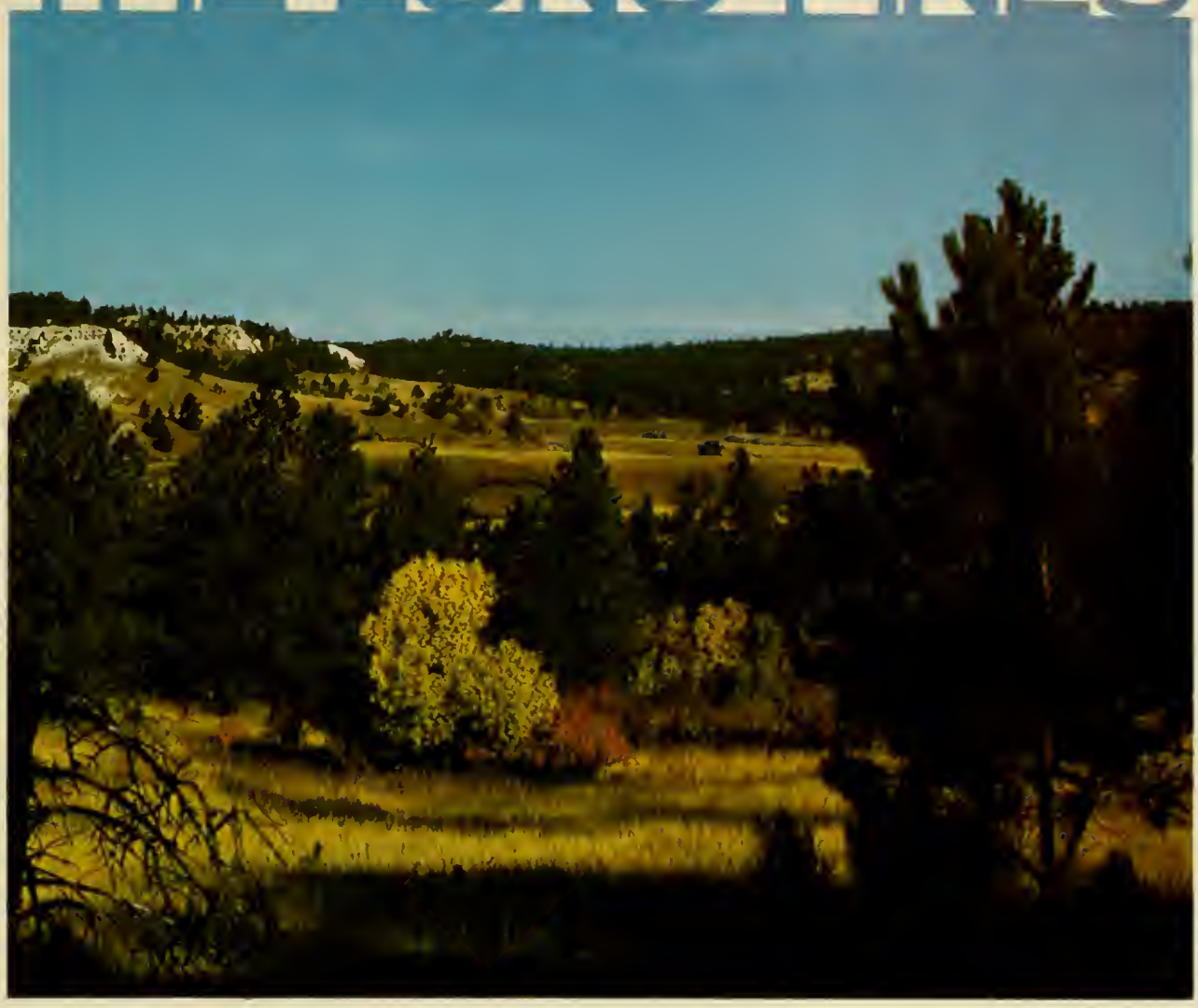
THE LONG PINES



F&G photo by Bob Martinka

Armed with the archaic Mining Law of 1872, Mobil Oil and other energy companies are busy in the Long Pines. Hopefully, future mining activity won't transform this remote and resource-rich region into a miniature Appalachia.

article by Ken Walcheck

IN THE PLAINS country of southeastern Montana, a forested "L"-shaped ridge called the Long Pines rises 1,200 feet above the surrounding land. This small range of rolling hills—only 15 miles long and 11 miles wide—contains spectacular rock outcroppings, towering ponderosa pines and park-like meadows.

Many drainages with diverse vegetation crisscross the 65,000 acres of the Long Pines, situated in Carter County within the Sioux Division of the Custer National

continued

Forest. Here, white-tailed and mule deer, Merriam's turkeys, sharp-tailed grouse, golden eagles and many other wildlife species find sustenance.

Like many areas rich in natural beauty and resources, this remote region is beset by a potential mining venture which could transform it into a miniature Appalachia.

A 1974 newspaper story, barely noticed by most people, sent shivers down the spines of a few concerned Montanans. The article reported that Denver-based Mobil Oil was quietly and efficiently prospecting for uranium in the Long Pines. The article further reported that 1,165 claims, representing about 23,000 acres of Forest Service (FS) lands, had been staked by Mobil.

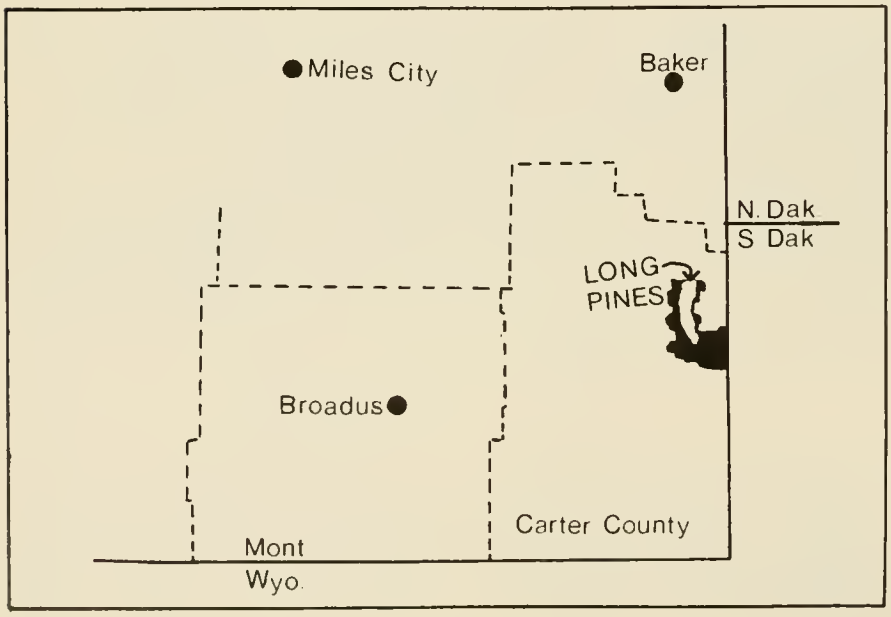
Also, according to Action for Eastern Montana, a Sidney-based nonprofit area planning corporation, an additional 120,495 acres—public and private land—has been claim staked in Carter County, predominantly for bentonite and uranium.

"That's disturbing," you say, "but so what? I live in Kalispell (or Missoula, Great Falls, etc.). I have never even heard of the 'Long Pines.' We have our own problems. Since the fox is already in the hen house, why worry about prospecting or possible mining in this remote area?"

The Long Pines, as well as all national forests and public lands, belong as much to you as they do to an American citizen in Point Barrow, Alaska. In fact, a big chunk of the United States—over 760 million acres—is really *your land*. You own about 3.5 acres, if it were divided equally among all Americans.

Most people assume—incorrectly—that national forests are secure from impairment by commercial interests. But what might happen in the Long Pines has already happened on numerous national forests and other public lands. How can individuals and mining firms exploit natural resources within an area supposedly dedicated to protecting natural scenery and opportunities for outdoor recreation?

The answer lies in obsolete mining laws, dating to 1872. Specifically, the mining law of 1872 provides that, "All valuable mineral deposits in lands belonging to the United States . . . shall be free and open to exploration and purchase . . . ." The Wilderness Act of 1964 slightly changed the scope of the 1872 law by cutting off minerals exploration in 1974 and allowing mining in wilderness areas only until 1984. But the old law still applies in some national parks and monuments such as Mt. McKinley National Park in Alaska and Death Valley National Monument in California and Nevada.

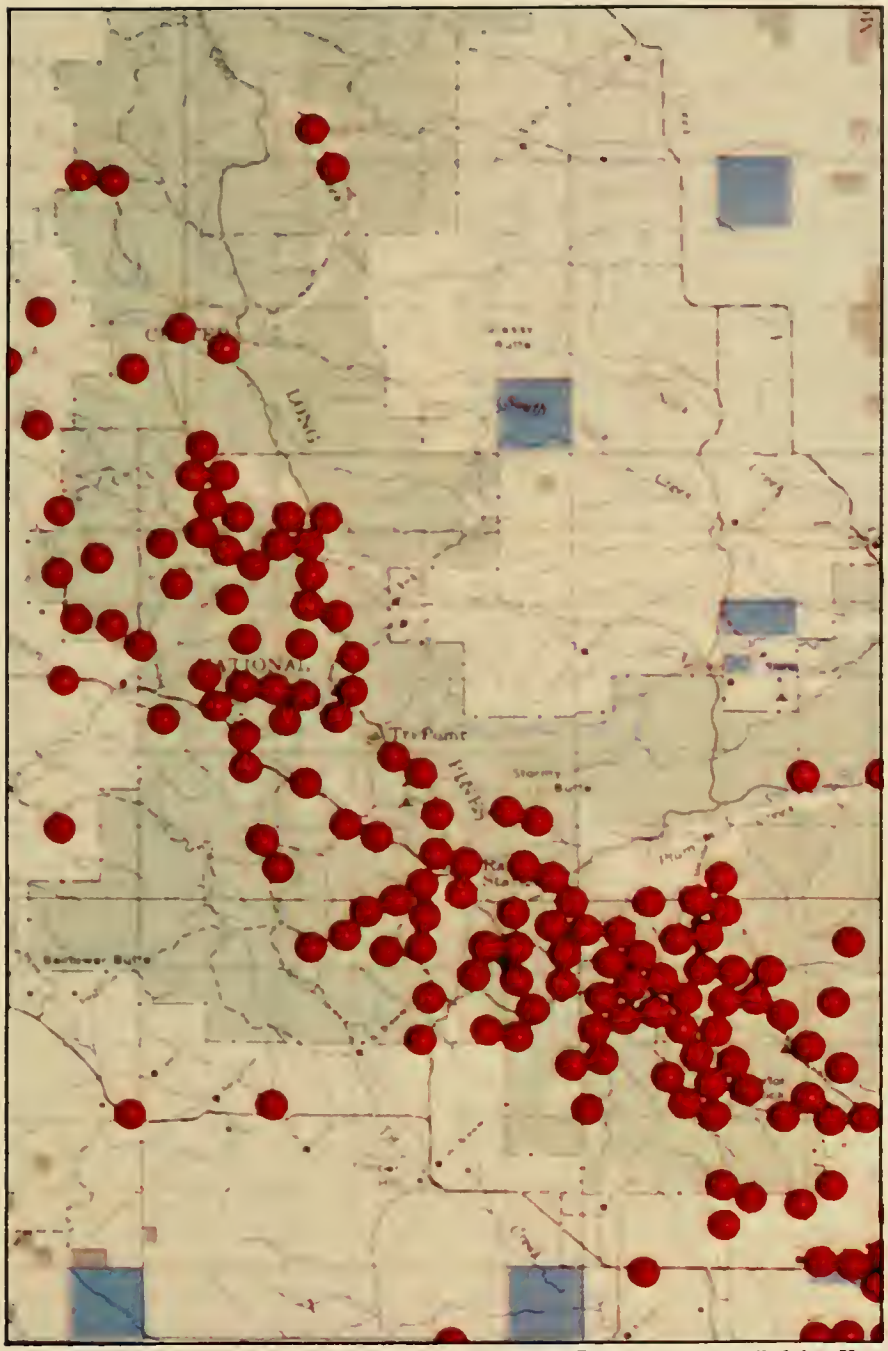


Under the antiquated laws, the miner need only establish sufficient "mineralization" to stake a claim on public land. Before Sept. 1, 1974 when the provision was amended, the miner wasn't required to notify the federal government of the mine's location and a federal permit wasn't needed to operate. Nothing in the federal law controlled his operation or required restoration or treatment of "disturbed" land. *By a relatively simple process, a miner still can obtain a patent to his claim that gives him ownership of the property.*

In 1973, Mobil Oil rotary drilled in the Long Pines to determine geologic attractiveness of the area—199 holes 200-1,200 feet deep. As of 1974, 71 additional holes (none in the Long Pines) were approved by the Department of State Lands (DSL), each affecting approximately one-tenth of an acre. Mobil theorizes that uranium deposits are located in the deeper (900-1,200 feet) geologic formations and centered its drilling in the Fox Hill sand formations.

Although an earlier prospecting permit expired, Mobil Oil was issued a second permit which allowed the drilling of 36 holes in their Ekalaka project in Carter County. The new permit did not include any locations in the Pines. And, the permit specified that ". . . no holes may be added or relocated in or within one mile of any national forest lands, or similar forested ecosystems without the prior written approval of the Department [of State Lands]. No roads, excavations, drill site pads or other disturbances will be allowed without prior written approval of the Department [of State Lands]."

Pinpointing the uranium deposit in the Pines has been a major problem since uranium ore occurs in small, drift-like deposits scattered over a wide area. Mobil employs "fences" (lines of drill



Each red pin represents a uranium lease in the Long Pines area. compiled by Ken Walcheck

holes about 300 feet apart), to pinpoint uranium reserves. This process "brackets" the ore body and makes it possible to determine the economic feasibility of mining it.

Also, Felmont Oil Corp. of Midland, Tex., is exploring five sites in the Pines. Felmont believes that uranium deposits are located in different and shallower geologic strata so exploratory work has been primarily confined to an area east of the Pines.

Faced with this beehive of activity, the FS does not have a "big gun" to wield under federal law. It lacks authority to protect the public's interest from private exploitation of minerals—even if an overriding concern to save the Long Pines exists.

However, not all of the FS' fire power is muzzled. Under federal regulations, it initiates action to request withdrawal of specific federal lands from mineral entry *if* a "critical factor" (historical, archaeological, geological, etc.) of high value to the public is present.

The following areas have already been withdrawn from mineral entry in the Long Pines: (1) Wickham Gulch Campground —80 acres, (2) Lantis Springs Campground—80 acres and (3) Capitol Rock—240 acres subject to existing claims at the time of withdrawal.

The National Environmental Policy Act (NEPA) of 1969 could offer a second avenue of protection successfully used in the past. This act firmly establishes as national policy the obligation of federal agencies to avoid environmental destruction in carrying out their responsibilities. It states that Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.

What legal effect could the NEPA have in preserving the Long Pines? Apparently not much, if a position statement (Oct. 5, 1973) forwarded to the DSL by Custer National Forest Supervisor D.C. MacIntyre is any clue. MacIntyre stated, "With the information we now have, we believe the prospecting work that is being done by Mobil Oil is justifiable. They are operating within the specifications stated in both state and federal permits. A concerted effort has been made by the Corporation to meet or exceed our requests," MacIntyre wrote.

"Also, the coordination between your office [DSL] and ours is functioning to complement the responsibility of the other . . . . As mentioned at recent meetings, we believe that the present prospecting activity does not violate the National Environmental Policy Act," he continued. "However, if the intensity of the activity reaches a level of more surface disturbance, i.e., road construction, leveling drill sites, etc., the Forest Service will then require an environmental analysis report in advance of the proposed activity."

Inspection of Mobil's prospect-

continued

ing activities and reclamation drill sites shows a concerted effort to do a good job. Numerous vehicle trails exist in the Pines, so no new roads have been constructed. Mud and drill cuttings are confined to the site and a backhoe utilized to dig and fill the mud pits. Reclamation of land disturbed by drillings consists of topsoiling, discing, mulching, fertilizing, seeding with native perennials and fencing to keep livestock out. After several on-the-ground inspections of the reclaimed sites, it appears "establishing a permanent, diverse vegetative cover of predominantly native species," as required by Montana law, will present no major difficulties. Reclamation costs average about $1,700 per acre or $170 per hole, according to Charles Greenburg, reclamation manager for Mobil Oil.

However, small drill site reclamation presents far fewer reclamation problems than those anticipated if full-scale development occurs.

The 1973 Montana Strip Mining and Reclamation Act, administered by the DSL, has effectively regulated prospecting activities of Mobil and Felmont.

A unique feature of the 1973 act has been implemented to regulate prospecting activities in the Pines. Section 9 states, in part: "The Department [DSL] shall not approve the application for prospecting or strip mining permit where the area of land described in the application includes land having special, exceptional, critical, or unique characteristics . . . ." That section covers a wide spectrum of areas such as those with "biological productivity," "ecological fragility," "ecological importance" and "scenic, historic, archaeologic, topographic, geologic, ethnologic, scientific, cultural, or recreational significance." Because of Section 9, DSL has withdrawn an Indian ceremonial mounds area in the south central sector of the Pines.

Lawrence L. Loendorf, chairman of the Department of Anthropology and Archaeology at the University of North Dakota, maintains that one "cannot overestimate its [archaeological] importance." Loendorf believes the Long Pines is rich in archaeological remains and stresses the importance of preserving the cultural heritage.

Undoubtedly, the area possesses a rich cultural heritage. According to Dee C. Taylor, professor of anthropology at the University of Montana, the general area was occupied by bands of Dakota (Sioux) and Cheyenne. Possibly Crow, Atsina and Hidatsa frequented the area, too.

Little professional archaeological research has been conducted in the Pines. Felmont Oil hired archaeologist Dale E. Fredlund to do a preliminary four-day reconnaissance east of the Pines in April 1974. Fredlund found nine archaeological sites, ranging from tepee rings to a bison jump. In the recommendations section of his final report, Fredlund commented that, "It must be noted that whenever road construction or heavy equipment is moved to reach drilling sites the chances of destroying archaeological sites is greatly increased." Unfortunately, he failed to speculate about the impact of uranium mining on such sites.

The red flags of warning, spelling out the possibilities of uranium mining in the Pines, have rippled in the wind for more than a year. Federal and state agencies received and acknowledged the warnings and now they're gearing up for the possibility of future mining activity.

The FS is preparing a land use management plan for the Custer National Forest, scheduled for completion in March 1978. (Completion date for the Montana portion of the Sioux [Long Pines] District is July 1976.) The process includes two steps: (1) collection and analysis of resource data and related information about the area and (2) involvement and consultation with the public to develop management alternatives. After completion of the study, the FS can better consider consequences of mining on the environment and use of its authority under the NEPA.

New clout was delivered to the FS on Sept. 1, 1974 when amended provisions were implemented to regulate use of national forest lands by persons formerly operating under the 1872 mining laws. Some of the important changes include:

• *Notice of intent to operate*—Miners and prospectors must now give the FS advance "notice of intent" that they plan operations on national forest lands. If the FS decides that such operations will cause significant environmental disturbance, the operator must submit a plan showing *how* he expects to conduct the mining or prospecting. The revised regulations also specify that the FS assess the environmental impact and prepare any environmental impact statements that might be required by the NEPA.

• *Bonding provision*—Operators must provide a bond commensurate with expected reclamation costs. In addition to a plan for the actual mining and prospecting, a reclamation plan for explored or mined areas must also be submitted.

The FS has required a plan of operations from Mobil Oil for its Long Pines exploration. As MacIntyre explained, "The plan of operations request will be reasonable and will not ask them to speculate into the future. There will be a plan of operation prior to and covering any mining before the mining occurs, which will allow us to analyze the environmental impacts and make recommendations to minimize surface resource damages. But until the company has had a chance to evaluate the ore body as to tenor and quantity," he emphasized, "all we can reasonably request is a plan of operations covering further exploration work. Mobil has been submitting a plan of operations prior to implementation of the rules."

The Department of Fish and

Game believes the Long Pines qualifies as an area described in Section 9 of the Montana Strip Mining and Reclamation Act. The importance of the Long Pines as a wildlife-producing area is verified by Merriam's turkey studies conducted by the department and records of hunter harvest reflecting the area's productivity. A project proposal, "The Implications of Uranium Mining on the Ecology of the Long Pines Area," has been prepared by the Department of Fish and Game and a sponsor is being sought to finance this essential inventory. The three-year study will provide a comprehensive wildlife and vegetation inventory, identify specific areas where conflicts may occur between mining and wildlife and assess the relative impact of alternative methods for reducing wildlife loss and vegetation destruction.

These studies will supply meaningful data that will hopefully help avoid major resource use conflicts in the Pines. As Lt. Gov. Bill Christiansen wrote in a letter endorsing the proposal, "A delicate relationship exists between federal land managers, resource developers and state regulatory agencies. Specifically, the potential for conflict exists between rights granted under federal law (especially statutes regarding locateable minerals) and provisions of the reclamation act passed by the Montana State Legislature. To be more precise, federal law and regulations grant the right to mine, while Section 9 of the reclamation act grants the state the discretion to deny mining. For obvious reasons we would prefer not to see this basic confrontation."

If Mobil decides to mine, what kind of method will be used and does the 1973 act contain the necessary constraints to insure proper control of uranium mining? (1) It's doubtful that the act is adequate to insure proper control over open pit uranium mining. Very little is known about reclamation of uranium-mined lands. (2) Montana has *no statutory control* over either underground uranium mining or deep solution uranium mining.

Capitol Rock, one of the unusual rock formations in the Long Pines. F&G photo by Ken Walcheck

Because of the depth at which uranium deposits are found in the Long Pines, Mobil Oil will consider the deep-leachate or solution mining method. The solution method uses sulfuric acid as the leaching agent, which is injected into inflow wells. Simultaneously, when the inflow starts, pumping begins in a central production well which brings the uranium out of the ground in a dissolved form.

Utah International, Inc., has experimented with the solution mining technique since 1960 and found limitations to the extraction process. However, properly controlled, overall recovery equals or exceeds that accomplished in underground mining in the same area.

Present shortages of oil and natural gas make it clear that other sources of energy must be developed quickly if the U.S. is unwilling to face the reality of serious and mandatory energy conservation. Energy companies are scrambling to line up uranium sources as an alternative. The scarcity warning was recently underscored in a joint report by the Nuclear Energy Agency of the Organization for Economic Co-operation and Development and the International Atomic Energy Agency which stated that, "urgent steps must be taken to increase the rate of exploration for uranium so that an adequate forward reserve may be achieved. . . . It is important that this matter be fully appreciated by governments, utilities, and mining companies."

The big uranium rush has already hit Montana. A check with the clerk and recorder for Carter County showed about 8,000 uranium claims filed from 1970-1974. Of these, approximately 1,800 have been filed in the Long Pines. According to the DSL, uranium prospecting is under way in 20 counties: Broadwater, Carbon, Carter, Cascade, Dawson, Deer Lodge, Fallon, Fergus, Gallatin, Garfield, Golden Valley, Judith Basin, Madison, Musselshell, Petroleum, Powell, Silver Bow, Sweet Grass, Wibaux and Yellowstone.

What does the future hold for the Long Pines? Attempting to answer this question, brings to mind a statement made many years ago by a professor who concluded a lengthy dissertation with, "I know you believe you understand what you think I said, but I'm not sure you realize that what you heard is not precisely what I meant to say."

Such is the present situation in the Pines. The future of this unusual area depends on *what we want it to be.* The public has the right, responsibility and opportunity to decide what course should be taken.

editorial

is strip mining inevitable?

by Carolyn Alderson

Strip mining does very little for man, land or beast. However, it does more for a few people than for either land or animals. It is difficult to contemplate—except in light of today's crazy, upside-down social, economic and political climate—why strip mining is allowed in the first place. The lion's share (85-95 per cent) of the nation's coal reserves—including Montana's—lie too deep to strip mine. Further, it is difficult to understand why some consider it "inevitable" or even advisable to strip mine Montana or anywhere else. If something is basically inadvisable, why should it be considered inevitable? Strip mining is environmentally bad and therefore, inextricably bad for people.

Because eastern Montana abounds with springs, wells and dry creek beds with water flowing under them, the area provides good grazing for livestock and plentiful game. Areas surrounding the water offer good browse for deer, grass and cover for upland game birds. Coal supplies the aquifer for almost all of this ground water. And, a Montana Bureau of Mines study of the ground water in the area around the Decker mine shows alarming drops in water levels. Ground water cannot be restored. Without water, vegetation on spoil banks is useless.

Whether reclamation is possible is a matter of definition. In most areas, *something* will grow on the spoil banks, although the lower the rainfall, the more difficult revegetation becomes. Also, consider the fact that most Montana soils and overburden contain a degree of salinity. At Decker, for example, the combination of saline overburden and low rainfall will make "reclamation" extremely difficult. Power plants and air pollution will add to reclamation problems.

Perhaps the main difficulty with reclamation lies in the attitudes of those responsible for seeing that it's done and those responsible for doing it. The livelihood of a farmer or rancher depends on his treatment of the land; obviously, a successful mining operation depends on getting to what is underneath as cheaply as possible. To people in the mining business, land, with its grasses, trees, shrubs and water constitutes "overburden." Every dollar spent on reclamation cuts into coal company profits.

Legislation is only as good as its enforcement. No company will do one bit more than required of it by the letter of the law and public pressure. We can only hope that government agencies will stand up to the "look how much we have invested" arguments, when the time comes to close down an operation for repeated violations.

How can one deny the pictures in magazines, newspapers and on television saying that reclamation is possible? In fact, the grass in the

pictures appears taller and thicker than surrounding native range. One is almost tempted to believe that strip mining and "reclamation" are actually helping this land. While it is always tricky to expound on the "nature of nature," a few facts cannot be avoided. One "unavoidable" is that the climate, soils, flora and fauna of eastern Montana are different from those of Puerto Rico, Connecticut, Ohio or Illinois. The West has historically suffered by refusing to accept and live within this basic fact—from three of the Homestead Acts to present plans for strip mining and industrialization.

Introduced species of grass and forage may *look* better than native species, especially if they are fertilized and irrigated, but they are *not* better unless and until they survive under local climatic extremes over an extended time. One wonders if the ranchers or wildlife would wait around for the 50 years it takes to find that out.

Even without industrialization, large-scale strip mining would significantly alter the amount and kind of water and forage available to wildlife and domestic animals. However, the most significant point is that *massive industrialization of the Fort Union region would not happen if strip mining were stopped or severely curtailed.*

Industrialization in the Colstrip area already causes game violations and pressures on game populations not previously anticipated. Without strip mining, industrialization and the accompanying battles over transmission lines, railroads and water (from dam sites to slurry pipelines) would virtually cease.

Is the strip mining of Montana's good land inevitable? Is it necessary for the "good of the nation"? Must we sacrifice Montana's special environmental, social and political good health for a definition of "national good" which is made not by Montanans, but by a few elite groups in Washington and New York City? Strip mining legislation has caused four long years of struggle across the nation. Any good legislation has resulted from long hours of work and the unfaltering belief that nothing is inevitable unless people allow it to be.

Montana produces food and recreation for a nation hungry for both. In a time of world and even national food shortages, is it not folly to take land out of agricultural production and people off the land? Many sound, economical ways to conserve energy and alternative energy sources exist which do not require such destruction.

Whatever is inevitable depends on us.

Carolyn and Irv Alderson. F&G photo by Steve Knapp

EASTERN MONTANA

——a few self-explanatory glimpses

photo by Jon Cates

photo by Jon Cates

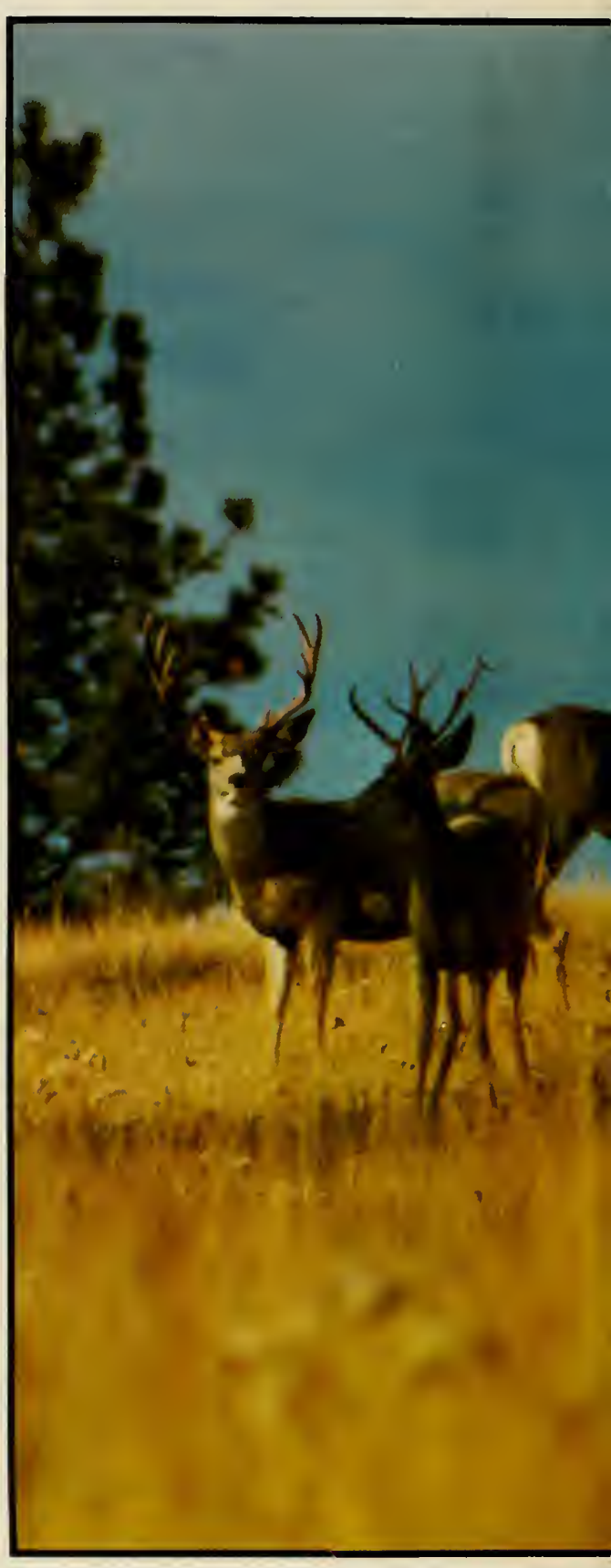


photo by Vince Fischer

EASTERN MONTANA

F&G photo by Tom Mussehl

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EASTERN MONTANA

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F&G photo by Bill Schneider

F&G photo

photo by Jon Cates

EASTERN MONTANA

F&G photo

photo by Carol Harlow

photo by Jon Cates

EASTERN MONTANA

photo by Carol Harlow

photo by Carol Harlow

THE CATCHALL

The Circle West Project:

Burlington Northern Runs More Than a Railroad

Burlington Northern, Inc. (BN) runs more than this country's largest rail system. The corporation controls vast tracts of land and extensive coal deposits. Testifying to this, the Great Falls branch of D.A. Davidson & Co., an investment firm, recently reported that BN owns over 62 billion tons of low sulfur coal (11.4 billion tons presently mineable) or *over one-fifth of the world's total reserves.*

In Montana, BN has private mineral leases in over 34 counties, by far the state's largest owner. According to John Willard, BN's regional manager for public relations, BN holds mineral rights for 3,643,565.13 acres and surface rights on 1,290,198.37 acres. It also controls more mineral deposits in the eastern Montana portion of the Ft. Union formation, the world's richest coal deposit, than any other single company.

In winter 1974, BN purchased —through a subsidiary, Glacier Park Co.—the 30,000-acre Dreyer Bros. Ranch in remote west central McCone County. When combined with formerly owned BN lands and associated state and federal lands, purchase of this ranch locked up over 50,000 acres, most of which overlies the rich Weldon-Timber Creek coal deposit, estimated at a total of 724 million strippable tons. Late last spring, Dreyer Bros., Inc., now wholly owned by BN, applied both to the Montana Department of Natural Resources and Conservation and the Corps of Engineers for an annual allocation of 67,000 acre-feet of water from nearby Fort Peck Reservoir. This action made public the long expected and often discussed meld of eastern Montana lignite and Fort Peck Reservoir water.

BN plans a two-year study of the Circle West Project, as it's called. After that, Dreyer Bros., Inc. will construct industrial plants in three phases over an eight-year period. The plants will produce (1) ammonia for fertilizer, (2) methanol-methyl fuels (high performance fuels) and (3) synthetic diesel fuels. A pumping facility will be constructed on the shore of Fort Peck Reservoir and a pipeline four feet in diameter will run inland six miles to a holding pond near the industrial sites.

BN has not released plans covering many parts of its project, such as size of the gasification plants, estimates of construction and operation forces, location of a railroad and highway, utility corridors and magnitude of strip mining. Water not used by the industrial plants will irrigate the Dreyer property. At this time, BN has expressed no interest in exporting coal or producing electricity.

Nelson Creek Bay of Fort Peck Reservoir, where the requested water will be pumped, provided the hottest walleye fishing in Montana last spring. West central McCone County has for years supported one of the state's largest antelope populations and the area annually produces northeastern Montana's best crop of sharp-tailed grouse. Just how these animals and the area's other wildlife will be affected by coal development is impossible to predict, but evidence from the southeastern part of the state indicates the wildlife resource will suffer.

The political, financial and social wrangling involved in wrapping land, water and coal into an industrial package has already begun in other eastern Montana areas. However, four facts make BN's McCone County operation especially interesting.

(1) The Circle West Project marks BN's first attempt to mine and market its own Montana coal. With this company's vast coal reserves and financial resources, current development may portend additional activity in the near future.

(2) Settlement of BN's application for water should confirm whether Fort Peck water belongs to the state or the federal government. Most reservoirs authorized by an act of Congress also contain provisions about ownership of water. But Fort Peck Dam was authorized by an executive order, so the water issue remains unsettled. Undoubtedly, approval of BN's application will signal other more significant withdrawals.

(3) BN wants to reclaim its mined areas as irrigated pasture land. The current interpretation of Montana's Strip Mining and Reclamation Act calls for returning mined land to its former contours and planting the area in native grasses. Obviously, the outcome of this issue may affect wildlife.

(4) The Circle West Project marks the first really large-scale coal development in northeastern Montana. McCone County—like Rosebud County a few years ago—is sparsely populated prairie country, characterized by family ranching and grain operations, a stockmen's philosophy and relatively little political representation.

continued

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The various costs and benefits associated with coal development will come home to the people of McCone County and their northeastern Montana neighbors before the 1970s end. Their reaction to BN's activity combined with the attitudes of people in southeastern Montana will shape Montana's coal development and environmental stability into the next century.—*Mike Aderhold*

FIELD & STREAM DUMPS FROME

After many years of determined defense of wildlife, quality outdoor recreation and a better environment, *Field & Stream* has apparently buckled under to corporate pressure. "America's Number One Sportsman's Magazine" recently fired widely known and sometimes controversial conservation editor, Mike Frome.

Until last November, Frome wrote a hard-hitting monthly column for *Field & Stream*, which is owned by CBS, Inc. The magazine's management called it an "internal editorial decision." However, it's widely theorized that things were simply getting "too hot" for CBS officials who, in turn, ordered Frome's walking papers.

In his writing, Frome came down hard on many delicate political issues such as the Alaska pipeline, real estate hustling, poor forestry practices, federal dam building, stream alteration, antihunting sentiment, wilderness preservation, unsportsmanlike hunting, shoddy grazing programs, public land management and more. He championed wildlife as an indicator of where man's world was going and pointedly campaigned against habitat destruction.

Also, he exposed unresponsive—and sometimes unresponsible—politicians and bureaucrats. This meant publishing voting records and in-depth reports of bureaucratic boondoggles laced with names, details and other specific facts.

Frome confirmed this at a December 1974 gathering of the Montana Wilderness Association in Missoula. In his keynote address, he blasted federal bureaucrats for accelerating development of the Rocky Mountain region. Specifically, he called Interior Secretary Rogers C.B. Morton and Agriculture Secretary Earl Butz "two of the most dangerous men in America." The controversial writer named Forest Service chief John McGuire as a "close third."

Frome said leadership in wise land management "has got to come from out here." The Rocky Mountain region has the resources that Wall Street and the eastern bankers want, he noted.

The former columnist also recounted his last months with *Field & Stream*. In his years with the magazine, he wrote 75 monthly columns and 12 special features. Everthing went well, he remarked, until spring 1973.

With the editor's consent, Frome had traveled to New Mexico to follow up confidential reports of shady land dealings. After some hard-nosed investigating, he discovered a large real estate firm had suspiciously obtained—through land exchanges—title to a half million acres of Bureau of Land Management land. And the private developer stood to make millions selling his newly acquired real estate.

Frome detailed his findings in his monthly column and sent it off for publication in the June 1973 issue. But it never appeared in print—the first sign of corporate censorship, according to Frome. At the Missoula conference, the writer explained how things went from worse to terrible after that. In October 1973, he received the letter of dismissal. The correspondence didn't, in Frome's words, "contain any reasons for the dismissal."

(Frome's pen was similarly silenced a few years ago. The *American Forests* magazine canceled Frome's regular column after he "felt obligated" [his words] to reveal the injustices of poor timber management such as overcutting in the national forests.)

After hearing Frome speak and visiting with him personally, one can easily regret the absence of his voice in "America's Number One Sportsman's Magazine." Fortunately, however, his pen won't sit idle. Frome told MO he will continue to work for wildlife and man by "facing the gut issues on all fronts."—*Bill Schneider*

HELP FROM RELOADERS

Following a tradition established by the Pittman-Robertson Act of 1937, shooting sportsmen may increase their multimillion dollar excise tax contribution to conservation and outdoor recreation through proposed legislation to place an 11% excise tax on handloading components (such as bullets, shot, primers, etc.).

Introduced by Rep. John D. Dingell (D-Mich.), the bill differs from previous excise tax legislation on sporting arms and ammunition because it will provide important new funding for shooting range construction and hunter safety education. While Rep. Dingell's bill provides that one-half the revenue collected from handloading components be earmarked for wildlife restoration, states will be *required* to use the other half for range construction or improvement and for hunter safety education. This takes into account the fact that most handloaded ammo is burned up on rifle and pistol ranges and trap and skeet fields.

Rep. Dingell's bill also contains the provision that, if a state fails to use its allocation for range construction and hunter safety education over a two-year period, its share will revert to a special fund available for use by other states which have more extensive range and hunter safety needs. After one more year, any unused revenues will drop back into the migratory bird fund, used to lease or purchase wetlands for ducks and geese.

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Allocations to individual states will be based on state population figures as determined by the U.S. Bureau of the Census. However, no state will receive over 3% or under 1% of the yearly total which, conservatively estimated, would be about $6 million. Added to the one-half share of excise tax revenues from handguns and archery equipment, these funds could give a real financial boost to range construction and hunter safety education across the country.

Significantly, private shooting clubs could qualify for these federal funds if they agree to open their facilities to the public and also agree to fix range fees on a cost basis. Of course, states may also use these funds to construct new public shooting facilities for trap and skeet or rifle and pistol target shooting. This is great news for shooters in many parts of the country where shooting facilities are not only few and far between, but also overcrowded most of the time.

Begun almost 40 years ago, the Pittman-Robertson Act has collected over half a billion dollars for conservation. It is the basis of one of the best programs ever devised for the benefit of wildlife, game and nongame species alike, and has enabled the states to greatly expand their conservation activities.

Rep. Dingell's components tax bill would not only add to this vital conservation work; it would also help insure the future of the shooting sports.—*National Shooting Sports Foundation*

WESTERN COAL—A FOOL'S BARGAIN?

For years, energy companies actively publicized the environmental attractions of substituting low sulfur western coal for high sulfur eastern deposits. However, the Sierra Club, the Environmental Defense Fund and other environmental organizations recently exposed this myth. These groups feel it's better environmentally *and* economically to burn certain eastern coal and leave western deposits in the ground. And a federal Environmental Protection Agency study backs up their contention. (See "The Sulfur Myth," Sept./Oct. 1974 *Montana Outdoors.*)

Now, the Northern Plains Resource Council (NPRC) has released some figures cementing these conclusions. The EPA now limits sulfur emissions to 1.2 pounds per million BTUs, according to the Billings-based citizen group. In the accompanying table, the three western coal deposits will, if burned without stack scrubbers, violate this regulation.

This effectively torpedoes a popular philosophy promoted by energy companies. Until now, they applauded western coal because it contained so little sulfur that it could be burned without installing expensive stack scrubbers to reduce sulfur dioxide emissions.

However, this new evidence makes it obvious that scrubbers will be needed when most western coal is burned. Also, at least two of the eastern mines listed in this table are underground operations

continued

Company and mine	Sulfur content (% per pound)	BTU* value per pound	Pounds of SO_2 per million BTUs
Peabody Coal Co. Big Sky Mine, Montana	.75%	8,450	1.78 lb.
Western Energy Co. Colstrip Mine, Montana	.80%	8,750	1.82 lb.
Rosebud Coal Sales Co. Rosebud Mine, Wyoming	.88%	10,450	1.69 lb.
C.D.R. Enterprises, Inc. Borderland Mine, Kentucky	.65%	12,300	1.05 lb.
Harlan Fuel Co. Harlan #1 Mine, Kentucky	.85%	14,000	1.21 lb.
Kessler Coals, Inc. Mine #1, West Virginia	.80%	13,600	1.17 lb.

*British Thermal Units (BTUs) are a measurement of heat content. These figures were obtained by taking the BTU value per pound and dividing it into 1 million to realize the amount of coal needed to create 1 million BTUs. In the case of Peabody's mine, it is 118 pounds of coal for 1 million BTUs of heat. Then multiply the pounds of coal needed by the sulfur content per pound and double it for the pounds of SO_2 per million BTUs. Sulfur is one half the content of SO_2, which is the reason for doubling this figure.

$$\frac{1{,}000{,}000 \text{ BTU}}{8{,}450 \text{ BTU/lb.}} = 118.343 \text{ lbs.} \qquad 118 \times .0075 = .88757 + .88757 = 1.77514 \text{ or } 1.78$$

(The figures on sulfur and BTU content of the eastern mines were taken from "Producers of Coal From Low Sulfur Seams in the Appalachian States," published in the Keystone Coal industry manual.)

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which provide more jobs and create less environmental havoc. The three mines are, according to NPRC, fair *examples*—not those with the lowest sulfur content. In fact, many eastern mines produce coal with lower sulfur content than those listed here.

These facts add considerable weight to the "go slow on western coal development" argument supported by many Montanans.

ATTENTION SUBSCRIBERS

About a year ago, we converted our circulation to a computerized system. Although the computer made distribution of *Montana Outdoors* more efficient and less cumbersome in our offices, it didn't do it more rapidly. It's still complicated and time consuming.

Under the new system, we send out four renewal notices—two before the subscription expires, one at expiration and one after expiration. For economic reasons, we prefer to have subscribers renew before their subscription expires. This decreases paper work, postage and other expenses.

Many subscribers renew early. However, in about a month they may still receive another renewal notice. If this happens and you've already renewed, *please disregard* this second notice. Unfortunately, it takes a month or more to process new subscriptions and renewals. Other transactions such as sending cookbooks or calendars also take time. We do, however, make a special effort to send gift cards immediately.

We're working on this and hopefully, we can speed up the process. But in the meantime please bear with us.

COAL PRICES WORRY TVA

The nation's largest utility, the Tennessee Valley Authority (TVA), is panicky over rising coal prices according to the *Mountain Eagle*, an environmental newspaper in Kentucky.

A TVA employe told the *Eagle*, "It's getting a little freaky around here. Every time someone mentions the word coal, someone else tries to bid on it. I wouldn't be surprised to hear that Aubrey Wagner (TVA chairman) himself was out on the side of the road picking up the coal that falls off coal trucks."

TVA has called for a voluntary 20% cutback in electricity use by consumers.

contributors

When he's not talking about his latest paddlefish discovery, **Al Elser** might well be extolling the glories of eastern Montana fishing. A regional fisheries manager for the Miles City area, Elser's article about the Tongue River on page 2 leads off our special eastern Montana issue.

We are grateful to **Arnold Miller**, president of the United Mine Workers of America, for allowing us to reprint parts of his article, "The Energy Crisis: As a Coal Miner Sees It." The article first appeared in *The Center Magazine*, a publication of the Center for the Study of Democratic Institutions. Turn to page 7.

Miles City information officer **Ken Walcheck** shares fact and feeling in his contributions to this eastern Montana issue. He examines the impact of mining and prospecting in the Long Pines, a resource-rich but little known area near Ekalaka. He has also compiled the answers to "What's Going on Out There?"—answers that paint an all-too-clear picture of eastern Montana coal development. See his articles on pages 15 and 39.

Guest editorialist **Carolyn Alderson** looks at the effects of strip mining on game, habitat, ground water, vegetation, grazing—and concludes that what is inevitable depends on individuals. Alderson and her husband, Irv, ranch in the heart of the coal country near Birney, Mont. At its last annual meeting, Northern Plains Resource Council elected her vice chairman. Her editorial begins on page 20.

Burlington Northern has more irons in the fire than the parallel variety that trains run on. What used to be a 30,000-acre ranch in remote west central McCone County is now part of BN's Circle West Project. **Mike Aderhold**, Glasgow information officer, tells readers what BN's plans include—and what environmental considerations the plans exclude. See page 31.

Gene Allen and **Vern Craig** collaborate to enlighten readers about the controversial, cunning and competitive predator, the coyote. Allen heads the department's research section, headquartered at Montana State University, Bozeman. Craig is the department's special assistant. In addition to frequent articles, his contributions include some very special cartoons and illustrations. Their article starts on page 36.

If you see a remodeled commercial fishing boat called the "Dolly Varden" cruising Flathead Lake, chances are good that "Skipper" **Laney Hanzel** is aboard, adding to the department's knowledge of the lake and its inhabitants—including the elusive Flathead Lake monster. Hanzel, a fisheries management biologist based in Kalispell, has led the investigation since its inception in 1966. He answers many questions, including some that are bound to help out any angler. Turn to page 44.

RETRACTION

In the Jan./Feb. 1975 issue, we inadvertently made the statement, "The proposed Ski Yellowstone development will provide facilities for about 6,500 skiers annually." This should have read, ". . . 6,500 skiers daily." We regret this error and retract the incorrect statement.—*Ed.*

MONTANA POWER IN WYOMING

Northwest Resources Co., a subsidiary of Western Energy (which is, in turn, a wholly owned subsidiary of Montana Power Co.), plans to open a 700,000-ton-per-year strip mine at Grass Creek near Meeteetse, Wyo. A mining permit has already been issued to the company by the Wyoming Department of Environmental Quality. Production will start at 10,000 tons per year and peak in the fall of 1976.—*High Country News*

DEVELOPMENT SPEEDS UP

Coal development in Wyoming, Montana and the Dakotas is proceeding faster than anticipated.

So says Northern Great Plains Resource Program manager, John VanDerwalker. He thinks 1980 production will surpass the original estimate by 37%.

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license fee increase

The 44th Montana Legislature is considering raising resident and nonresident license fees. Because of fast-moving legislative action occurring while this magazine is in print, we can't make specific comments on the proposal. However, we do have some fundamental reasoning to pass along.

Your Department of Fish and Game has a host of responsibilities. The department:

- supplies hunting, fishing, trapping, camping, picnicking and other outdoor opportunities,
- provides access and protection for some critical fish and wildlife areas,
- distributes conservation information,
- enforces game laws,
- coordinates landowner/recreationist agreements,
- conducts game and nongame research,
- develops state parks and recreation areas and much more.

In addition, modern times have further increased our obligations. Today, because of the impact on fish and wildlife habitat, we must be deeply involved in coal/energy development, rural subdivision, stream alteration, timber practices, weather modification and similar issues.

And while present programs receive more emphasis and new obligations are continually added, department income has remained relatively static. In fact, with the exception of a fishing license increase and the permit required to hunt mountain lions, fees haven't increased since 1967.

Nobody must be reminded of what has happened to the economy since 1967. Our cost of operations has increased 20% alone. And competition for land and water has intensified.

Thus, increasing pressure on fish and wildlife habitat coupled with more demand for department services has us in a real fix. We should step up crucial projects like acquisition of key habitat areas, access and research. But we can't. Instead, we're faced with the unsavory decision of *cutting back* on important programs. We don't like missing opportunities to protect vital habitat or implement important studies. But there's no choice.

Simply stated, a license fee increase is essential to maintain quality and quantity hunting and fishing in these inflationary times.

Most department income comes from fishing and hunting license sales. For the past few years, the number of hunters and fishermen has gradually increased. But in the near future, we expect this to level off—or perhaps even decrease slightly.

The second major source of income is federal taxes on hunting and fishing equipment. These excise taxes go into the famous Pittman-Robertson and Dingell-Johnson funds, which are set aside for exclusive use in wildlife restoration. This money is allotted to the states on a matching basis. The size of this allotment depends on the size of the state and on the total license sales. Since Montana's license sales will probably remain static, additional relief from these funds isn't likely. Most of the money in these funds comes to the states on a matching basis—three federal dollars for one state dollar. Unfortunately, however, Montana won't always have that "one dollar."

Other miscellaneous funding sources exist. But none of them will provide the needed relief.

The department also has cooperative agreements with some federal agencies and private companies. However, it's becoming increasingly difficult to meet our end of the bargain.

Faced with this dismal future, the only logical answer is a license fee increase.

Compared to other western states, Montana's fees are, for the most part, pitifully low. For example, the average of the resident elk fees for the other western states is $16.72. Montana's is $3. The western average for resident deer is $8.40. Ours is $3. For antelope, the western average is $11.60. Montana's is $3. Montana's fees are the lowest in these and most other categories.

Although nonresident fees are also proposed for increase, we must be careful not to place an unreasonable burden on the out-of-stater. (See "The Federal Take-over," *Montana Outdoors*, Jan./Feb. 1975.) We could even lose the right to manage nonmigratory wildlife. Also, a ceiling on nonresident hunters looms as a real possibility, which will cut deeply into department income.

All this means the resident sportsman *must pick up more of the tab*. If not, we won't meet pressing responsibilities—and the future of hunting, fishing and other wildlife-related recreation in Montana will become even more doubtful.—*Fletcher Newby*

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COYOTES AND GAME

—new research in a continuing controversy—

by Gene Allen and Vern Craig
illustrations by Vern Craig

For centuries, coyotes have drawn both scorn and admiration from their most competitive predator—man. On one hand, man admires the coyotes' cunning, adaptability and indomitable tenacity to life. On the other, he curses the canine because it competes with humans, to some degree, for livestock and game.

In spite of all the fuss they generate, the coyotes' role in nature's overall scheme is, at best, poorly understood. Their cumulative impact on other wildlife is mostly speculative.

The name "coyote," comes from the Aztec "coyotl," and was apparently handed down by the Spaniards. Its scientific name, *Canis latrans*, means "barking dog." This barking dog is much smaller than most people think, averaging about two feet high at the front shoulders. Males usually weigh more than females, and while some of the heavyweights approach 50 pounds, most tip the scales at 20-30 pounds. The coyote bears a thick fur coat—luxuriant and glossy when prime, but tattered and shaggy when shedding.

LOVE LIFE

Breeding occurs in late January through February, although the time varies with elevation and latitude. Coyotes may pair for several years, but some males take more than one mate. One study showed 35% of young coyotes became sexually mature their first year—the rest not until they were 20-22 months old. With favorable environmental conditions (primarily abundant and available food, usually rodents), more animals breed at a younger age and produce larger litters. (Remember this capability when artificial control is considered.)

The female prepares dens in which young are born. A den may be a hole dug in the ground, an enlarged badger hole, a hollow tree or a crevasse in a rock pile. One female may prepare or partially prepare several den sites before choosing her nursery. Unlike many wild creatures, the male coyote is a model father, staying with his mate and doing much of the hunting for both her and the new family. Gestation is 60-63 days, so pups are usually born from late March to early May. They are blind and helpless at birth.

The average litter contains five or six pups, but litter size varies considerably. A Texas study indicated that litter size varied inversely with the coyote population. With a dense population, litters were small. When the population was sparse, litters were large. Thus, dense populations apparently

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result in smaller average litter sizes than sparse populations and create another built-in valve favoring species survival.

Intensive control probably opens this reproduction valve. Control which lowers coyote densities may stimulate breeding in a larger percentage of remaining females and in production of larger litters since nature attempts to compensate for any factor which decreases the population.

GROWING UP

Pups suckle from three to eight weeks. During the first few weeks, the male hunts while the female tends the pups.

The pup's eyes open in nine to fourteen days and at about three weeks they venture to the den opening for a peek at their new world. When the young reach two months old, families begin to break up. The newly independent young become more active within their accustomed haunts and subsequently a large number of them disperse, seeking homes of their own. This dispersal peaks in December and January before annual mating.

A THORNY WORLD

Young coyotes must adapt quickly to survive competition with other wildlife and man's persecution. Research shows that annual mortality for coyotes one year and older may reach 40% in populations not undergoing trapping or any other artificial control. As a result of the Texas studies previously cited, Frederick Knowlton, a U.S. Fish and Wildlife researcher, states that 70% of spring coyotes (prewhelping) are under 3 years old and less than 5% exceed 9 years of age. The oldest coyotes studied were 13 and 14 years old. About 50% of fall populations were young of the preceding spring.

During late fall and early winter, nature takes a heavy toll of the young, inexperienced coyotes as they disperse and learn to fend for themselves. About half will be lost even without control. Trapping for pelts at this time is successful, but control attempts are practically a wasted effort, since nature is already effectively culling the population. Coyotes taken during this period are probably *not* in addition to expected natural mortality; nature would cull them from the population even without control.

Control probably stimulates emigration of animals from more densely populated areas nearby. Control might trigger production of larger litters during the upcoming breeding season, as discussed earlier.

Artificial control should logically occur in late January and February before whelping—nature has done most of its trimming, the population has hit its yearly low, breeding has taken place and it precedes the time when livestock depredations are traditionally greatest. Animals taken by artificial methods at this point probably represent losses beyond those suffered naturally. This point can't be overemphasized: Artificial control during late fall and early winter probably has little effect on overall coyote mortality, nor does it reduce coyote depredation problems the next spring. Also, any benefits gained this year cannot be expected to carry over into future years.

DENSITIES AND DIETS

Under very favorable conditions, population densities may reach from five to six coyotes per square mile. But such densities would be unusual and occur in a given area for a short time. The literature shows an average of one coyote per one or two square miles to be normal over most of its range. Surveys by game research biologist Duane Pyrah in 1973-74 near Winnett, Mont., indicated a density of slightly under one coyote for every two square miles. Mature males probably establish a home range of under 10 square miles while mature females range over a smaller area.

Coyotes have a capital appetite. They'll gulp down anything digestible and some things that aren't. Most forage in the first few hours after dark, although they appear quite active before sunset. The most inactive periods occur from 1 a.m. to daybreak and from midmorning to late afternoon. Although rodents and rabbits make up the bulk of their menu, coyotes are opportunists and take whatever food comes easiest. If the most available item happens to be an unprotected lamb or a fawn, coyotes take advantage of the situation. This is where they get into trouble with their human adversaries.

A casual observer might conclude that if coyotes kill deer fawns, they reduce deer populations. Such a conclusion oversimplifies a complex relationship. Several agencies in western states—among them the Montana Department of Fish and Game—have initiated projects to fit together pieces in the predator-prey puzzle. The department's research will

continued

"Not me. I never do anything wrong."

recycled paper

examine the relationship between coyotes and deer, antelope and game birds.

Knowledge of predator-prey relationships, predator control effectiveness and predator responses to land use changes is in short supply. Coyotes' influence on wildlife populations under various conditions, their response to attempted control and the side effects of predator control raise complex questions.

Primary objective of the department's research is to determine the effect of coyote predation on game populations in Montana through the following procedures:

• *Improve techniques for estimating coyote density.*

A "scent post" technique has been a common method for determining coyote population trends. The technique utilizes a 3-foot circle of sifted earth or sand, with a capsule containing an attractant in the center. Each census route consists of 50 scent posts at .3 mile intervals. Census takers visit the posts for five consecutive days, record the species of animal visiting the station (from tracks) and smooth the ground so the next visitor leaves clear footprints.

But such a system only indicates coyote population *trends*. Hopefully, researchers can improve the technique to provide a reliable measure of actual coyote density.

Another technique utilizes coyotes' responses to some sounds. For example, sirens cause coyotes to howl. Atmospheric conditions affect howling response, with best results during clear weather.

Another technique locates coyotes from aircraft. Attaching lightweight radio transmitters to the animals opens up an additional avenue for gathering data.

• *Determine the density of coyotes in relation to habitat and available food.*

This research will be conducted in control and noncontrol areas. Types of control used in Montana include: trapping, denning (digging out dens), hunting and aerial gunning. Also, the M-44 (a sodium cyanide spring-loaded ejector mechanism) has been approved for experimental use in 21 counties. The compound 1080, formerly a popular chemical control, is now illegal.

Comparisons between control and noncontrol areas will enable researchers to evaluate effectiveness of artificial control methods. The effects of various land uses on coyotes will also be studied.

• *Determine the biological factors limiting coyote populations.*

This investigation of reproduction, size of home range and population dynamics promises to be one of the most difficult and fascinating segments of the study. Certain aspects of the study *seem* rather cut and dried. For example, it's commonly assumed that reducing coyote numbers will result in other wildlife increasing. However, many facts do not bear this out. The high reproductive potential of coyotes under good conditions may mean that control merely crops the population and that the surplus normally lost to nature is artificially taken. Coyotes can double or even triple their numbers each year. Survival of wild animals is often affected by seemingly remote situations. For example, losses from one mortality factor are sometimes compensated for by less mortality from other factors. Artificial control then may simply reduce coyote losses from other causes.

Some studies show substantial use of 1080 depressed local coyote populations. Whether this affected game numbers is still unknown. Control methods used for a long time tend to become less effective. It is possible that sustained use of poison baits attracts the type of coyote most apt to feed on carrion, thus gradually building a strain more inclined to hunt down its food than to scavenge. Such genetic selectivity commonly occurs with use of pesticides and with medicines which combat diseases. If this holds true, control could worsen the livestock depredation problem.

Coyotes have highs and lows under natural conditions, without artificial controls, just like other wild animals. Success of reproduction, age at which coyotes breed, litter size and survival are apparently more closely tied to abundance and availability of food than to any artificial means of control.

It is interesting to note that coyote numbers declined significantly in some western states following the ban of 1080 in 1972. The U.S. Fish and Wildlife Service reports no significant change in nine states, including Montana. (While the actual Montana coyote index was actually slightly higher, it was not statistically significant.) Increases were noted in 5 of 17 western states. The downward trend in coyote numbers appears to be moving east, probably a response to reduced rodent populations.

• *Examine effects of predation on deer and antelope fawns and game bird populations.*

Documented instances of negative effects of coyote predation on populations of large wildlife species are rare. Studies in Oregon and Utah indicate that coyote predation *slowed* the *increase* of small antelope herds and *intensive* control resulted in higher fawn survival in both states. While coyotes may be able to locally depress antelope and deer production, such situations are probably limited to areas of high coyote density and small herds in marginal habitat.

Logically, to benefit wildlife, coyote control should extend only to local situations where it could increase the game available to hunters. The economics of control versus produced benefits must also be a major consideration. Money should be spent where it most benefits hunters.

The department's research will continue for six years. Results will hopefully provide more adequate information for evaluating the effects of coyote predation on Montana's game populations.

recycled paper

What's going on out there?

—eastern Montana coal development summary compiled by Ken Walcheck—

Preparing a complete recap of all coal-related energy development in eastern Montana is an awesome undertaking, to say the least. However, what's happening out there is of vital concern to all Montanans. So we're making this effort to summarize the most important developments.

Where will the coal go? Will it be burned in Montana to generate electricity? Or, will it be exported? How many strip mines, coal gasification plants, transmission lines and thermal generating plants can Montana expect? What will the total impact be?

Hopefully, the following information helps answer some of these frequently asked questions. However, please keep in mind that the state of Montana's decision about Colstrip #3 and #4—which may occur while this magazine is in print—will greatly influence the future course of coal development.

HOW WILL MONTANA COAL BE USED?

1975

electrical generation in Montana	export
0.32 Knife River Coal Co. for Sidney plant	4.33 Western Energy Co.
0.50 Western Energy Co. for Corette plant, Billings	8.25 Decker Coal Co.
0.40 Western Energy Co. for Colstrip #1, coming on line	4.00 Westmoreland
	3.00 Peabody Coal Co.
1.22 million tons	19.58 million tons

1980

electrical generation in Montana	export
0.32 Knife River Coal Co. for Sidney plant	10.00 Western Energy Co. (minimum)
0.50 Western Energy Co. for Corette plant, Billings	13.90 Decker Coal Co.
3.00 Western Energy Co. for Colstrip #1 and #2	3.00 Peabody Coal Co.
5.60 Western Energy Co. for Colstrip #3 and #4 (if approved by the State of Montana)	6.50 Westmoreland
9.42 million tons	33.40 million tons

(These projections courtesy of the Montana Energy Advisory Council)

What's going on out there?

PROJECTED MONTANA COAL PRODUCTION FROM COAL SALES CONTRACTS, BY YEAR

		1974	1975	1977	1980
Peabody	[1]	2,700,000	3,000,000	3,000,000	3,000,000
Western Energy	[2]	2,837,000	5,230,000	13,500,000	19,100,000
Knife River	[3]	320,000	320,000	320,000	320,000
Decker	[4]	7,000,000	8,250,000	10,900,000	13,900,000
Westmoreland	[5]	1,500,000	4,000,000	6,500,000	6,500,000
		14,357,000	20,800,000	34,220,000	42,820,000

[1] The Peabody figures are estimates obtained from corporate headquarters, St. Louis, Mo. Another major sales contract for their Big Sky mine near Colstrip is being negotiated.

[2] Projections for Western Energy's Big Sky mine at Colstrip include coal consumed at Colstrip #1 and #2 for 1975 and beyond. For 1980, estimates include coal that would be furnished to Colstrip #3 and #4. If units #3 and #4 are not approved by the State of Montana, a projected 13,500,000 tons would be mined each year. Yearly totals would drop accordingly.

[3] Knife River Coal's mine at Savage, Mont., produces lignite, exclusively for the 50 megawatt Lewis and Clark steam plant near Sidney. The mine's annual production for the last eight years averaged just over 321,000 tons.

[4] Projected production for the Decker Coal mine north of the town of Decker drops from 1978 to 1979, reflecting a short-term contract that expires in 1978. It is very likely that future coal sales contracts will bring the 1980 projection to the 1978 level of 14,500,000 tons.

[5] Westmoreland Resources has not yet negotiated a contract or contracts that would boost projections for its Sarpy Creek Mine to the 6,500,000 tons projected for 1977. The company recently provided two unit train test shipments to domestic utilities and the Montana Energy Advisory Council believes that coal sales at the elevated level can be almost definitely anticipated.

FACILITIES UNDER CONSTRUCTION, APPLIED FOR OR PUBLICLY PROPOSED

FACILITY	LOCATION	CAPACITY	STATUS
Colstrip generating plants #1 and #2	Colstrip, Rosebud County	330 megawatts (mw) each [330 mw = 330,000 kilowatts]	Under construction by Bechtel Corp. for Montana Power Company (MPC)—50%. Puget Sound Power and Light—50%. Colstrip #1 due on line September 1975. Colstrip #2 due on line September 1976.
Transmission line (red arrow on map, pages 42-43.)	Colstrip-Broadview (about 110 miles)	230 kilovolts (kv) [230 kv = 230,000 volts] Metal towers will have capacity to carry 500 kv lines.	MPC and Puget Sound Power and Light applied June 29, 1973 for a certificate to build the approximately 110-mile transmission line from their two 330 mw generating plants now under construction at Colstrip, west to Broadview. On Nov. 15, 1974, the Board of Natural Resources and Conservation unanimously approved the application.
Colstrip #3 and #4	Colstrip, Rosebud County	700 mw each	MPC (30%), Puget Sound (25%) Portland Gas and Electric (20%), Washington Water Power (15%) and Pacific Power and Light (10%) have an application to construct these two plants pending before the Energy Planning Division of the Department of Natural Resources and Conservation (DNRC). Final decision is made by the Board of Natural Resources and Conservation.

Transmission line (blue arrow on map, pages 42-43.)	Colstrip-Hot Springs (Sanders County) MPC's preferred route is 426 miles, along the route shown on pages 42-43.	Two parallel 500 kv lines to connect Colstrip #3 and #4 with the Northwest power grid.	Application pending; same status as Colstrip #3 and #4.
Burlington Northern (BN) synthetic fuels plant	northwest of Circle, McCone County, on Dreyer Bros. ranch, now wholly owned by BN	Daily production: 1,000-3,000 tons ammonia; 2,500-5,000 tons methanol-methyl fuel; 10,000-30,000 barrels synthetic diesel fuel. Also, 12,000-32,000 acre-feet of water and 5-13 million tons of lignite would be consumed annually.	Dreyer Bros., Inc., a BN subsidiary, has applied to the DNRC for rights to 67,000 acre-feet of water annually from Fort Peck Reservoir for industrial and irrrigation uses. Construction of parts of the industrial complex could atart within the following time frames: ammonia—2 years, methyl fuel—3-5 years, synthetic diesel fuel—5 years. No construction decisions have been made, but BN is proceeding with feasibility studies. It is uncertain whether the facilities would fall under provisions of the Montana Utility Siting Act.
Northern Natural Gas and Cities Service Gas Co. gasification complex	southeastern Montana or northwestern Wyoming	Four "standard" synthetic natural gas (SNG) plants. Each plant has a capacity of 250 million cubic feet per day. The complex will use 108,500 tons of coal per day.	Northern Natural and Cities Service plan to construct four 250 million feet per day coal gasification plants. Peabody Coal has agreed to supply 800 million tons of coal and the gas companies are negotiating for another similar amount. Through 1975, $10-11 million will be spent on initial development. Construction could start in 1976-77 with operation in 1979 or 1980. Peabody's reserves lie within the northeastern portion of the Northern Cheyenne Reservation and their validity is in doubt.
Colorado Interstate Gas and Westmoreland Coal Co.	southeastern Montana	One "standard" SNG plant, using 25,000 tons of coal per day.	Colorado Interatate has an option on 300 million tons of coal and 10,000 acre-feet per year of water to be supplied by Westmoreland for development of a gasification project. Status of feasibility studies is unknown.
Shell Oil Co.'s strip mine	Youngs Creek in the southeastern section of the Crow Indian Reservation	Two million tons the first full year, increasing to eight million tons per year by 1980. About 148 million tons of high quality, low sulfur coal is proposed to be mined.	Construction to begin in 1976 and production planned to start in mid-1977. Expected life of mine is 20 years, unless additional mines are opened, extending the projects to about 50 years. Loadout facility capable of handling 16 million tons per year to be supplied from additional pits in Tanner and Wolf creeks, possibly by 1985. Fourth pit (a new mine), in Squirrel Creek sometime in 1980s. Possible mine mouth facility—solid fuel conversion plant, 1985.
Gulf Oil Co.'s plans	near Volborg, 44 miles south of Miles City	Possible strip mining on 38,474 acres. Gulf Energy and Minerals Co. (GEM), a division of Gulf Oil, has requested 90,000 acre-feet per year of Yellowatone Basin water.	No action by the state is expected for about two years since the Yellowstone Water Moratorium Act of 1974 protects the Yellowstone from major diversions of water for industrial use until March 11, 1977. Construction of a converaion facility is also probable.

What's going on out there?

Like it or not, eastern Montana will undergo resounding environmental changes in the near future. Since 1973, 77 prospecting permits for coal and uranium were issued to 30 companies. Here's the latest rundown on those permits. (The pins on the map are color coded with those on the legend.)

Company	Acres To Be Disturbed	County	Mineral
Kerr-McGee	8.0	Carter	uranium
Peabody Coal	164.5	Rosebud	coal
Peabody Coal	63.3	Powder River	coal
Mobil Oil	11.4	Carter	uranium
Tenneco Coal	7.9	Prairie	coal
Tenneco Coal	11.9	Dawson	coal
Tenneco	27.7	Custer	coal
Mobil Oil	1.5	Wibaux	coal, uranium
Mobil Oil	0.2	Fallon	coal, uranium
Mobil Oil	7.5	Dawson	coal, uranium
Felmont Oil	10.0	Carter	uranium
Sun Oil	7.0	Powder River	coal
Mobil Oil	3.4	Musselshell	uranium
Mobil Oil	2.4	Yellowstone	uranium
Utah International	1.0	Custer	coal
Teton Exploration	3.0	Fallon	uranium
American Nuclear	4.5	Carter	uranium
Decker Coal	65.6	Big Horn	coal
Tenneco Coal	14.1	Richland	coal
Tenneco Coal	0.8	Fallon	coal
Tenneco Coal	3.1	Dawson	coal
American Nuclear	0.7	Carter	uranium
Burlington Northern	3.5	McCone	coal
Western Energy	12.0	Custer	coal
Western Energy	35.0	Fallon	coal
Western Energy	4.0	Carter	coal
Clay H. McCartney	7.3	Blaine	coal
Mobil Oil	10.0	Rosebud	coal

Consolidation Coal	21.4	Treasure	coal
Consolidation Coal	15.3	Big Horn	coal
Consolidation Coal	38.1	Rosebud	coal
Getty Oil	2.7	Dawson	coal
Getty Oil	2.0	Richland	coal
Amax Coal	2.0	Powder River	coal
Concho Petroleum	0.3	Big Horn	coal
Chevron Oil	3.0	Garfield	coal
Gulf Mineral	10.9	Custer	coal
Gulf Mineral	8.8	Powder River	coal
Exxon	21.3	Carter	uranium
Knife River Coal	0.6	Richland	coal

John Wold	1.2	Dawson	coal
Sun Oil	2.0	Richland	coal
Sun Oil	9.0	Dawson	coal
Consolidation Coal	5.0	Powder River	coal
Tenneco	10.8	Fallon	coal
Tenneco	2.4	Carter	coal
Tenneco	6.3	Rosebud	coal
Mobil Oil	6.0	Garfield	uranium
Western Energy	70.0	Rosebud	coal
Mobil Oil	0.7	Golden Valley	uranium
Western Nuclear	0.5	Carbon	uranium
Montana Nuclear	--	Carter	uranium
John Wold	4.5	Wibaux	coal
Mobil Oil	0.3	Petroleum	uranium
Tenneco	9.7	Wibaux	coal
Westmoreland	0.2	Big Horn	coal
Tenneco	7.4	McCone	coal
Tenneco	2.4	Garfield	coal
Tenneco	5.0	Roosevelt	coal
Tenneco	4.5	Sheridan	coal
Burlington Northern	1.6	Fallon	coal
Consolidation Coal	4.3	Prairie	coal
Consolidation Coal	9.1	Custer	coal
Continental	1.1	Sweet Grass	uranium
Mobil Oil	4.0	Richland	coal
John Wold	0.7	Roosevelt	coal
Mobil Oil	2.8	McCone	coal
Phillips	0.8	Dawson	coal
Phillips	3.2	Custer	coal
Phillips	2.0	Prairie	coal
Mobil Oil	1.2	Powder River	uranium, coal
N.R.G.	2.3	Big Horn	coal, uranium
Crisafulli	1.9	Dawson	coal
N.R.G.	2.5	Powder River	coal, uranium
Utah International	8.0	Garfield	coal
Utah International	4.3	Prairie	coal
Utah International	2.9	McCone	coal
Total	818.30		

In addition to this beehive of prospecting activity, five companies presently operate strip mines in eastern Montana.

Company	Location
Peabody	Colstrip, Rosebud County
Western Energy	Colstrip, Rosebud County
Knife River Coal	Richland County
Decker	Big Horn County
Westmoreland	Big Horn County

DEPARTMENT PROJECTS:

unraveling the mysteries of Montana's largest natural fishing and recreational lake

story and photos by Laney Hanzel

DOES A FLATHEAD lake monster exist? How can I catch a 20-pound trout in the lake? Why aren't there more kokanee (salmon) in our part of the lake this year? Why are they getting smaller?

These questions are examples of those most frequently asked of fisheries personnel working on Montana's largest natural fishing and recreational lake. Because of its size—126,000 surface acres or 197 square miles—and a maximum depth of about 400 feet, Flathead Lake offers an incredible range of outdoor recreation. Montanans and visitors expend over 120,000 man-days annually fishing in this unique and natural area. Pleasure boating and other water-based recreation roughly matches the amount of time spent by fishermen. Collectively, users expend about two man-days per acre on Flathead Lake.

The lake's location, in the heart of the Flathead Valley with the panoramic backdrop of the snow-capped peaks of Glacier National Park and the Bob Marshall Wilderness, adds to the area's desirability and makes it an attractive recreation stop.

Because people were concerned about the sport fishing in Flathead Lake, the Department of Fish and Game initiated a fisheries investigation on the lake in 1966. Project goals are (1) gathering the necessary scientific knowledge about the lake and fish and (2) formulating a fisheries management program to maintain quality sport fishing in the lake system. Without such data, adverse impacts exerted by existing and proposed water and land development cannot be adequately measured.

Department employes developed a study program requiring specialized gear and sampling techniques. The first—and most essential—piece of equipment was a large work boat to handle the varied, bulky sampling nets and equipment. In 1974, the "Dolly Varden," as she was named, completed her eighth year on Flathead Lake. Before coming inland, she spent six summers in Alaskan waters and Puget Sound as a commercial fishing boat.

During the first phase of the study, size, number and whereabouts of the 20 fish species inhabiting Flathead Lake was determined. The question researchers were most frequently asked was about the validity of the Flathead "monster"—probably a white sturgeon, 20-40 feet long. Department researchers recorded no information or sighting of such a fish; however several large holes found in the department's research nets have never been explained.

The project uses sonar (an electronic depth recording device) to help locate fish and determine their relative number, size and the water depth at which the fish are found. This instrument enables the project team to gather information without actually handling or touching the fish. Sensitivity of the sonar allows researchers to locate fish as small as four inches long at depths over 300 feet. The equipment can even tell you in which direction the fish is moving.

Use of the nets and sonar has already provided basic data about

abundance, size and seasonal distribution of 12 of the 20 species living in the lake. To catch trophy size trout, knowledge of seasonal fish movements and what the fish feed on is essential. With these facts and fishing tackle to get your lure to the depth of the fish, you will almost be assured of at least a bite. Who knows—you might even be jerked off the boat seat by one of the many lunkers dwelling in the lake's depths.

Initial netting and sonar work indicates fish do not occupy all waters at all depths. Fish such as lake whitefish and lake trout spend their entire existence near the lake bottom. Others—like the cutthroat trout and mountain whitefish—live near the surface. Still others like the kokanee select open water areas. Water temperature and available food determine the depth at which they live, varying from the surface to 100 feet deep.

Findings accumulated during the early part of the study act as a base from which more specific studies are planned. Recently, project emphasis shifted from general fish sampling over the entire lake during all seasons toward understanding the kokanee populations. Once this study ascertains why the size of salmon continually changes and identifies the mechanisms that trigger their movements, management recommendations can be implemented to maintain salmon of desirable size *and* a successful sport fishery.

An old commercial fishing technique, purse seining, has been employed to collect salmon. The net, 660 feet long and 67 feet deep, was specifically designed for Flathead Lake sampling conditions. The major advantage of purse seining is that it collects these open water fish. After needed information is gathered, the fish are marked, released and their movements observed. Salmon taken in the net range from 3-14 inches long. Results of this portion of the study were compiled in winter 1975 and will be available soon.

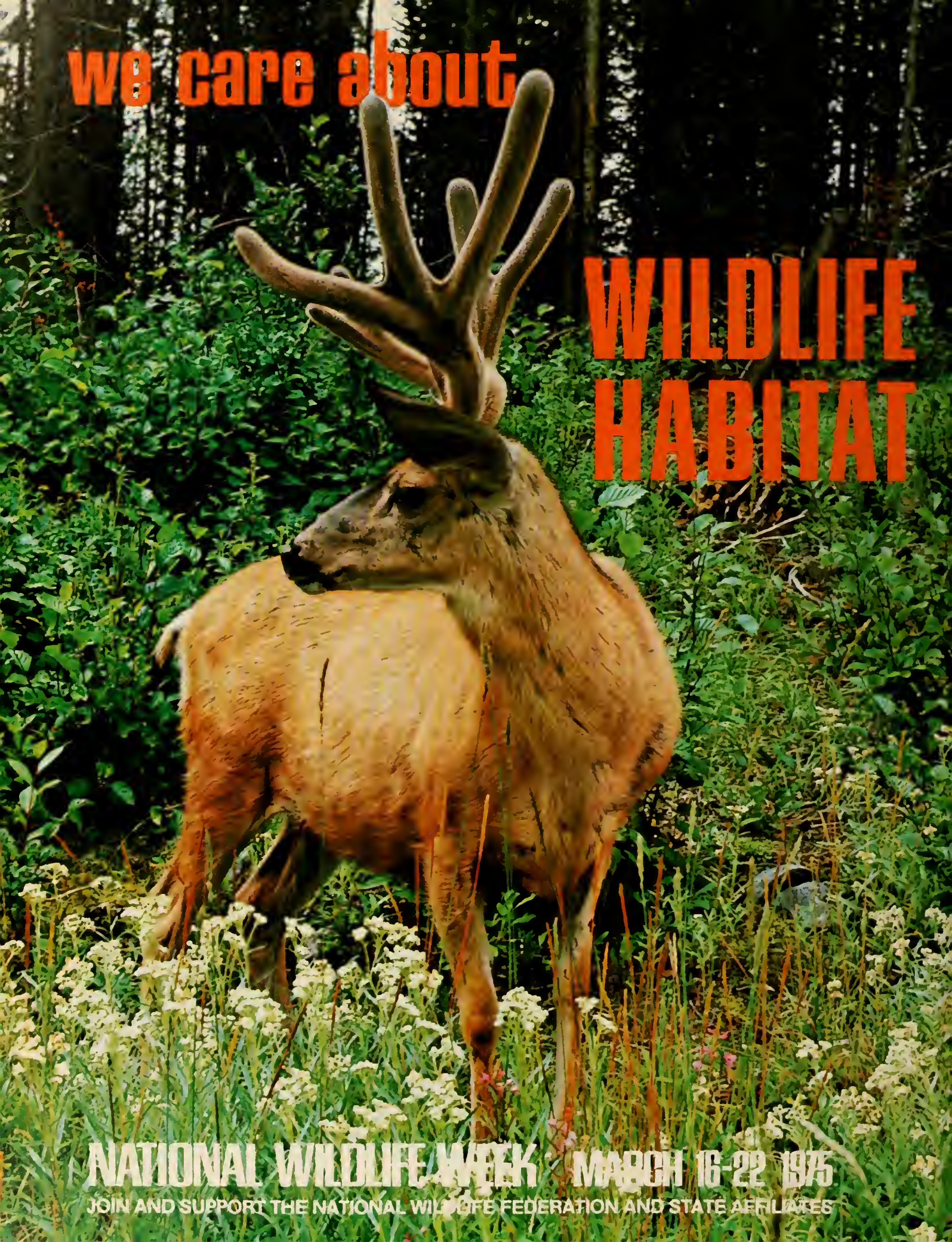
The cutthroat trout and Dolly Varden are next on the "study list." Both depend on natural reproduction and recruitment from the tributaries above the lake for perpetuation. So, this investigation will necessitate research on both the lake and river systems.

Another aspect of the project includes coordination between the department and other state and federal organizations working on the lake and river systems. Through cooperative efforts by several agencies, needed information and findings are broadened and attained in a shorter time.

If you want to hear or maybe even *see* more about the Flathead Lake fishery, visit the project, see the equipment working and meet the "Dolly Varden's" crew. Whenever you are in the Flathead area, contact the "skipper" at the Department of Fish and Game's Region 1 headquarters in Kalispell.

The Flathead Lake fisheries research boat, the "Dolly Varden," hauling in a purse seine. The net, 660 by 67 feet, catches fish without harming them so they can be marked, released and their movements followed.

Length groups of Flathead Lake kokanee, representing different ages, caught in Flathead Lake in a specially designed purse seine. Ages of the fish, from small to big, are one, two, three and four years.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